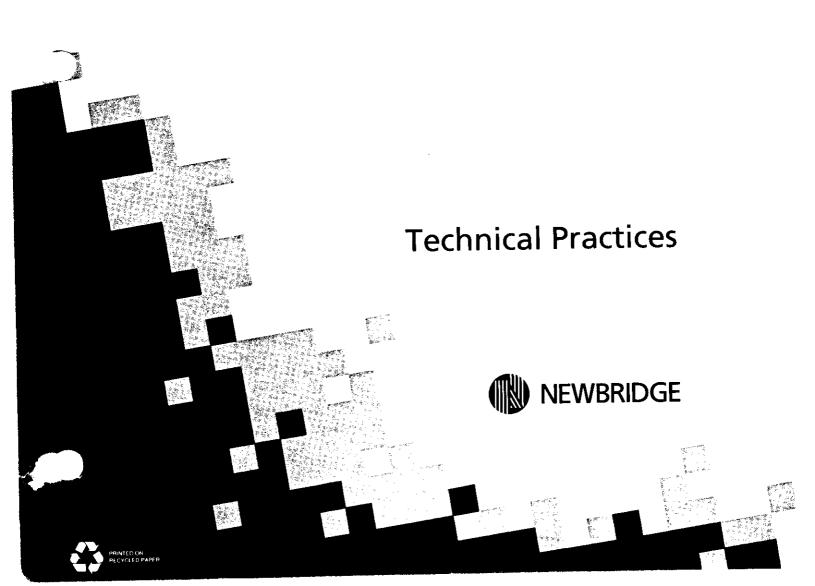
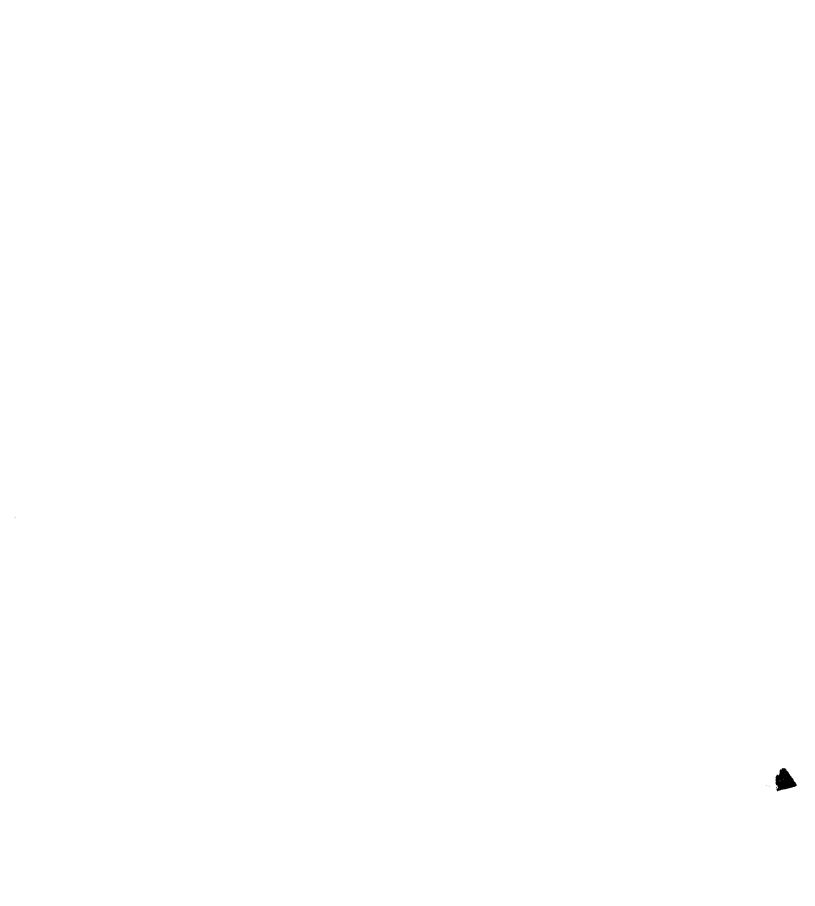
# 3624 MainStreet Intelligent T1 Channel bank

Release 7 Generic 6107/6207





# 3624 MainStreet Intelligent T1 Channel Bank

Release 7 Generic 6107/6207

**Technical Practices** 





## **Content Summary**

This Content Summary lists the volumes and chapters in the manuals that comprise the 3624 MainStreet Intelligent T1 Channel Bank Release 7.0 documentation package.

### Installation (95-B200-01-A0)

		<b>D</b>	. 1	4 2
Mandat	orv	Kegi	ula	tions

Canadian Department of Communications Regulations American Federal Communications Commission Regulations

-4	T	1	3	-43.	
1	Ι'n	tro	αu	CIIC	חנ

- 1.1 The 3624 MainStreet
- 1.2 3624 MainStreet Sections
- 1.3 Installation Summary

### 2. Pre-installation Procedures

- 2.1 Choose a Site
- 2.2 Required Tools and Hardware

### 3. Unpacking and Inspecting the Shipment

- 3.1 The Antistatic Wrist Strap
- 3.2 Unpacking and Inspecting the Shipment
- 3.3 Repacking the Shipment
- 3.4 Inventory Form

### 4. Grounding the 3624 MainStreet

- 4.1 About Grounding and Antistatic Precautions
- 4.2 Grounding the Wall-mount 3624 Unit
- 4.3 Grounding the Rack-mount Shelf
- 4.4 The Antistatic Wrist Strap

#### 5. The Control Card Modules

- 5.1 The Control Card
- 5.2 The Control Card Modules
- 5.3 Installing the Control Card Modules
- 5.4 Removing a Control Card Module
- 5.5 Setting the Line Build-out
- 5.6 Installing the DTU Modules

### 6. The Interface Card

- 6.1 Interface Card Variants
- 6.2 Installing the Interface Card

### 7. Installing the Interface Card Modules

- 7.1 Modules Supported by Each Interface Card Type
- 7.2 Module Positions on the Interface Card
- 7.3 Installing and Removing the Interface Card Modules
- 7.4 Affixing the Module Part Number Label
- 7.5 Installing and Removing the Blank Modules

### 8. Mounting the 3624 MainStreet

- 8.1 Mounting the 3624 on a Wall
- 8.2 Mounting the 3624 in a Rack-mount Shelf

### 9. Connecting to External Voice and Data Circuits

- 9.1 Overview of the Universal Interface Cards
- 9.2 Connecting to the Universal Interface Card
- 9.3 Connecting to the Universal Card (48 V)
- 9.4 Connecting to the LGS Card (48 V)
- 9.5 Connecting to the Rack-mounted Drawer

### 10. Connecting to the Network

10.1 The Network Connector

### 11. Connecting the Node Management Equipment

- 11.1 Serial Port Connectors
- 11.2 Connecting to the Node Management Equipment

### 12. Powering Up the System

- 12.1 Powering Up an AC Wall-mount System
- 12.2 Powering Up an AC Rack-mount System
- 12.3 Powering Up a DC Wall-mount System
- 12.4 Powering Up a DC Rack-mount System
- 12.5 Start-up Diagnostics
- 12.6 What's Next?

### 13. Connecting an External Alarm

- 13.1 Uses of an External Alarm
- 13.2 Connecting an External Alarm

## Configuration (95-B400-01-A0)

### A. In the Beginning

A1. The Node Management Terminal Interface

### B. Node Configuration

- B1. Serial Ports
- B2. Date, Time and Node Name
- B3. System Security

### C. Module and Circuit Configuration

- C1. Module Position Configuration
- C2. Circuit Numbering, Naming and Quick Configuration
- C3. Cross-connecting Circuits

### D. Primary Rate Link Configuration

- D1. T1 Module Operating Parameters
- D2. T1 Circuit Operating Parameters
- D3. Trunk Conditioning
- D4. Enhanced Alarm Handling

### E. Voice Modules

- E1. LGS Module
- E2. LGE Module
- E3. E&M Module
- E4. The Manual Ringdown Module

### F. Data Modules

- F1. The DNIC Module
- F2. The RS-232 Direct Connect Module
- F3. The X.21 and V.35 Direct Connect Modules
- F4. The OCU Module
- F5. The 4W TO Module

### G. Rate Adaption

- G1. Transparent Rate Adaption
- G2. HCM Rate Adaption
- G3. DDS Rate Adaption

### H. Timing

H1. System Timing

### I. Network Management

Configuration for Network Management

### Maintenance (95-B500-01-00-B)

### 1. Visual Indicators

- 1.1 3624 MainStreet LEDs
- 1.2 Control Card LEDs
- 1.3 Interface Card LED
- 1.4 Module LEDs

2.	Alarms	
	2.1	Alarm Conditions
	2.2	Alarm Classification
	2.3	Viewing and Editing Alarm Queues
	2.4	Logging Alarms
	2.5	External Alarm Indication
3.	System	Diagnostics
	3.1	Diagnostic Tests
	3.2	Running Specific Diagnostic Tests
	3.3	Viewing Diagnostics
	3.4	Viewing and Editing Signalling Leads
	3.5	Busy-out Circuits
	3.6	Displaying Information on Interface Modules and the Control Card
4.	Loopba	acks
	4.1	Using Loopbacks
	4.2	Voice Interface Module Loopbacks (E&M, LGS, LGE, and MRD)
	4.3	Loopbacks for 2601, 2602 and 2603 DTUs
	4.4	Loopbacks for the 2606 DTU
	4.5	Loopbacks for the 2608 and 2610 DTUs
	4.6	OCU Module Loopbacks
	4.7	DCM Loopbacks
	4.8	T1 Circuit Loopbacks
	4.9	T1 Link Loopbacks
	4.10	DDS Loopbacks
	4.11	Network Loopback
5.	Databas	se Management
	5.1	Preserving Your Configuration Database
	5.2	Viewing NVM Information
	5.3	Backing Up the Configuration Database
	5.4	Verifying the Backup File
	5.5	Restoring Configuration Settings
6.	Viewin	g CPSS Routing Information

### 7. Hardware Maintenance

6.1

6.2

- 7.1 Testing the Voltages of the Power Rails
- 7.2 Testing and Replacing the Fuse (AC Power Supply), Wall-mount Unit
- 7.3 Testing and Replacing the Fuse (AC Power Supply), Rack-mount Unit

### Quick Reference Guide (95-B450-01-00-B)

The Routing Table

Viewing Network Nodes

- 1. Softkey Summary
- 2. Loopback Summary
- 3. Command Summary

## Node Configuration Forms (95-B460-01-00-B)

## Ordering Information (95-B050-01-00-B)

- 1. Parts
- 2. Accessories

Master Index (95-B005-01-00-B)

# 3624 MainStreet Intelligent T1 Channel Bank

Release 7 Generic 6107/6207

Installation





## **Foreword**

The documentation set of the 3624 MainStreet Intelligent T1 Channel Bank contains the following manuals:

	Installation (Part number 95-B200-01-00-B)
	Configuration (Part number 95-B400-01-00-B)
	Maintenance (Part number 95-B500-01-00-B)
ā	Quick Reference Guide (Part number 95-B450-01-00-B)
ā	Node Configuration Forms (Part number 95-B460-01-00-B)
<u> </u>	Ordering Information (Part number 95-B050-01-00-B)
ō	Index (Part number 95-B005-01-00-B)
$\bar{\Box}$	Content Summary (Part number 95-B000-01-00-B)

**Configuration:** This manual provides the instructions required for all configuration operations for the 3624.

**Maintenance:** This manual explains all maintenance functions and how to perform them.

Quick Reference Guide: This manual contains a summary of the configuration and maintenance commands.

**Node Configuration Forms:** This manual contains a series of forms to fill out for planning and recording the configuration settings.

**Ordering Information:** This manual lists the available 3624 parts and their ordering numbers.

**Index:** This manual contains the indexes for the Installation, Configuration and Maintenance manuals.

Content Summary: This manual provides a listing of the main content of the manuals in the documentation set.

#### Installation

This manual provides the instructions required to install, ground, connect the external circuits, and power up the 3624 MainStreet.

Not all 3624 MainStreet systems include all of the components or features described in this manual. The components included and the features supported depend on the type of system and the generic software. This documentation set describes software generics 6107 and 6207, Release 7.

This documentation set describes the management of the 3624 node using the NMTI. A node management session can be initiated from the 4600 MainStreet family of network managers. If you are using a network manager, the menus and screens displayed by the network management software are the similar to those described in this documentation. Refer to the 4600 documentation for more detailed information.

### **Symbols**

Several symbols, explained below, are used in the 3624 documentation to draw your attention to important information.



DANGER: Danger indicates that the described activity or situation may pose a threat to personal safety.



WARNING: A warning indicates that the described activity or situation may/will cause equipment damage.



CAUTION: A caution indicates that the described activity or situation may/will cause service interruption.



NOTE: Notes provide information that is or may be of special interest.

## **Mandatory Regulations**

### Canadian Department of Communications Regulations

The Canadian Department of Communications(DOC) label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

The standard connecting arrangement code for the 3624 MainStreet Intelligent T1 Channel Bank is CA81A.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure, for their own protection, that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.



CAUTION: Users should not attempt to make electrical ground connections themselves, but should contact the appropriate electric inspection authority, or electrician.

The Load Number (LN) assigned to each terminal device, denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the load numbers of all the devices does not exceed 100. The Load Number (LN) for the 3624 MainStreet Intelligent T1 Channel Bank is non-applicable

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

## -48 VDC supplies

Where the 3624 MainStreet Intelligent T1 Channel Bank is equipped with a -48 VDC power supply, it is intended for use with power from a Canadian Standards Association (CSA) approved -48 VDC power source. A recommended CSA approved -48 VDC power supple is Model #SV48-13F, Switching Power Inc.

### **American Federal Communications Commission Regulations**

This equipment has been approved by the American Federal Communications Commission (FCC) as not being harmful to the telephone network when connected directly to telephone lines. Customers shall, upon request from the telephone company, provide the following information:

J	the FCC Registration Number – GQ64GN-17621-DD-N and GQ64GN-
	19493-XD-N
	the Universal Service Order Code (USOC) - RJ48C
	the Facility Interface Code (FIC) - 04DU9-B and 04DU9-C
	Service Order Code – 6.0P
<u> </u>	the Ringer Equivalent Number (REN) – non-applicable

The FCC registration numbers can be found on the product label located on the the bottom of the equipment.

The REN determines the number of devices you can connect to your telephone line and still have the assurance that these devices will ring properly when your number is called. In most, but not all areas, the sum of the RENs for all devices should not exceed five (5.0). To be certain of the number of devices you can connect to your line, as specified by the REN, call your local telephone company and request the information on the maximum REN for your calling area.

If any of your telephone equipment causes harm to the telephone network, the telephone company may temporarily discontinue service to your line. If possible and practical, the company will notify you in advance. If not, the company will notify you as soon as possible. With the notification you will be advised of your right to file a complaint with the FCC.

The telephone company may make changes to its facilities, equipment, operations and procedures which could affect the operation of your equipment. Before these changes are made, the company will provide advance notice that communications service will be interrupted.

FCC regulations prohibit the connection of customer-provided equipment to coin service (central office implemented systems). Connection to party lines is subject to tariffs; contact your state public service commission for information. In the event that repairs are needed to this equipment, contact:

Newbridge Networks Inc. Commerce Park, Building No. 4 Ogdensburg, NY 13669 (315) 393-9981

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### -48 VDC supplies

Where the 3624 MainStreet Intelligent T1 Channel Bank is equipped with a -48 VDC power supply, it is intended for use with power from an isolated secondary circuit of a Underwriters Laboratories Inc. (UL) listed -48 VDC power supply.

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# **Table of Contents**

Fore	word		
	Install	ation	
	Symbo	ls	1V
Man	datory l	Regulations	
	Canadi Americ	ian Department of Communications Regulations can Federal Communications Commission Regulations	vi
1.	Intro	duction	
	1.1	The 3624 MainStreet	1-1
	1.2	3624 MainStreet Sections	1-3
	1.3	Installation Summary	1-8
2.	Pre-i	nstallation Procedures	
	2.1	Choose a Site	2-1
	2.2	Required Tools and Hardware	2-3
3.	Unpa	acking and Inspecting the Shipment	
	3.1	The Antistatic Wrist Strap	3-1
	3.2	Unpacking and Inspecting the Shipment	3-1
	3.3	Repacking the Shipment	3-3
	3.4	Inventory Form	3-4
4.		unding the 3624 MainStreet	. 1
	4.1	About Grounding and Antistatic Precautions	4-1
	4.2	Grounding the Wall-mount Unit	4-1 4-7
	4.3	Grounding the Rack-mount Shelf	4-17 1-10
	4.4	The Antistatic Wrist Strap	<del>4-</del> 12
5.	The	Control Card Modules	- 4
	5.1	The Control Card	5-1
	5.2	The Control Card Modules	5-2
	5.3	Installing the Control Card Modules	5-4
	5.4	Removing a Control Card Module	5-6
	5.5	Setting the Line Build-out	5-6
	5.6	Installing the DTU Modules	5-6

6.	The 1	Interface Card
	6.1	Interface Card Variants6-1
	6.2	Installing the Interface Card6-3
7.	Insta	lling the Interface Card Modules
	7.1	Modules Supported by Each Interface Card Type7-1
	7.2	Module Positions on the Interface Card7-2
	7.3	Installing and Removing the Interface Card Modules7-3
	7.5	Installing and Removing the Blank Modules7-6
8.	Mou	nting the 3624 MainStreet
•	8.1	Mounting the 3624 on a Wall8-1
	8.2	Mounting the 3624 in a Shelf Assembly in a Rack8-4
9.	Conr	necting to External Voice and Data Circuits
	9.1	Overview of the Universal Interface Cards9-1
	9.2	Connecting to the Universal Interface Card9-2
	9.3	Connecting to the Universal Card (48 V)9-5
	9.4	Connecting to the LGS Card (48V)9-9
	9.5	Connecting to the Rack-mounted Drawer
10.	Conr	necting to the Network
	10.1	The Network Connector
11.	Conn	ecting the Node Management Equipment
	11.1	Serial Port Connectors11-1
	11.2	Connecting to the Node Management Equipment
12.	Powe	ering Up the System
	12.1	Powering Up a AC Wall-mount System 12-1
	12.2	Powering Up an AC Rack-mount System
	12.3	Powering up a DC Wall-mount System
	12.4	Powering Up a DC Rack-mount System
	12.5	Start-up Diagnostics12-10
	12.6	What's Next?12-14
13.	Conn	ecting an External Alarm
	13.1	Uses of an External Alarm13-1
	13.2	Connecting an External Alarm

# **List of Figures**

Figure	Title	
1-1	3624 MainStreet Wall-mount Unit (Exterior)	1-2
1-2	3624 MainStreet Rack-mount Drawer	1-∠
1-3	3624 MainStreet (Interior), Wall-mount Unit	1-3
1-4	3624 MainStreet (Interior), Rack-mount Drawer	1-4
3-1	Inventory Form	3-4
4-1	Location of Fuse Holder	4-3
4-2	Removing the Fuse Holder	4-3
4-3	Grounding Stud	4-4
4-4	Attaching a Ring Lug to the Chassis Ground Stud	4-3
4-5	Removing the Cable from the Ground Tap Screw	4-6
4-6	Attaching a Spade Lug to the Ground Cable	4-6
4-7	Attaching the Cable to the Signal Ground	4-/
4-8	Attaching the Antistatic Strap to the Rack-mount Shelf	4-8
4-9	Attaching a Ring Lug to the Rack-mount Shelf Ground Stud	4-8
4-10	Rack-mount Shelf Ground Stud Location	4 10
4-11	Rack-mount Shelf Ground Connection	4-104
4-12	Removing the Cable from the Ground Tap Screw	4-10
4-13	Attaching a Spade Lug to the Ground Cable	4~11 1.10 /
4-14	Attaching the Cable to the Signal Ground	4-12
5-1	Control Card Location in the Wall-mount Unit	5-1
5-2	Control Card Location in the Rack-mount Drawer	5-2
5-3	Location of the Modules on the Control Card	5-4
5-4	Installing a Control Card Module	5-5
5-5	Installing a DTU Module	5-7
5-6	Removing a DTU Module	5-8
6-1	Location of the Interface Card in the Wall-mount Unit	6-1
6-2	Location of the Interface Card in the Rack-mount Drawer	6-2
6-3	Installing the Interface Card	6-3
6-4	Interface Card Cable Connections and Captive Screws	6-4
7-1	Location of Interface Card Module Positions	7-2
7-2	Installing an Interface Card Module	7-3
7-3	Using the Module Extraction Tool	7-4
7-4	Sample of a Part Number Label	7-t
<i>7-</i> 5	Locating the Part Number on a Voice Module	7-5
7-6	System Configuration Panel	7-6
7-7	The Blank Module	7-6
7-8	Inserting the Blank Modules	7-2

8-1	Placement of the Mounting Screws	
8-2	Rack-mount Bracket Position	
8-3	Rack-mount Shelf and a 3624 Drawer	
8-4	Cabinet and Shelf Members	
8-5	Installing the Shelf in a 19-inch (48 cm) Rack	
8-6	Attaching the 23-inch (58 cm) Rack-mounting Brackets	8-7
8-7	Installing the Shelf in a 23-inch (58 cm) Rack	8-8
8-8	Pull-out Cabinet and Shelf Members	8-9
8-9	Depressing the Cabinet Member Tab	8-9
8-10	Shelf Member Latch	8-10
8-11	Attaching Cabinet Member to the Drawer	8-11
8-12	Aligning Cabinet Members with Shelf Members	8-12
8-13	Cabinet Member Tab	8-13
8-14	Attaching the Rear Blanking Plate	8-14
8-15	Attaching the Front Blanking Plate	
8-16	Attaching the Rear Blanking Plate	
9-1	Module Position/Connector Assignment for the Universal Card	9-2
9-2	Interface Card Connector Orientation	
9-3	Module Position/Connector Assignment for the Universal Card (48 V)	
9-4	Module Position/Connector Assignment LGS Cards	
9-5	Connection to the Interface Card on the Rack-mounted Shelf	
, 0	Condication to the Interface Card on the Nack Hounted Shell	
10-1	Pin/Signal Assignment of Connector J4	10.1
10-1	J4 Connector on the Control Card – Wall-mount Drawer	
10-2		
10-3	J4 Connector on the Control Card - Rack-mount Drawer	10-3
11-1	Location of Compositors IE and IC Mall manual Durant	11 1
11-1	Location of Connectors J5 and J6 – Wall-mount Drawer	
	Location of Connectors J5 and J6 – Rack-mount Drawer	
11-3	Pin/Signal Assignment of Connector J5	
11-4	Pin/Signal Assignment of Connector J6	11-3
10 1	ACD O I IC I WILL LAGO.	
12-1	AC Power Supply and Cord on Wall-mount AC System	
12-2	AC Power Switch and Plug	
12-3	DC Power Supply Unit	
12-4	DC Circuit Breaker	
12-5	Removing Existing Cable Support Bracket	
12-6	Attaching DC Power Distribution Assembly	
12-7	Attaching DC Power Interconnect Cables	
12-8	Attaching Spade Lugs to DC Input Power Cabling	
12-9	DC Power Terminal Block Connections	
12-10	Cabinet Member Tabs	
12-11	Location of LEDs on the Wall-mount Unit	12-11
12-12	Location of LEDs on the Rack-mount Unit	12-11
13-1	External Alarm Connector – Wall-mount Unit	13.1
13-2	External Alarm Connector - Rack-mount Unit	
13-3	Pin/Signal Assignment of Connector J7	
13-4	External Alarm Circuit	
		1 <b>0</b> -0

## List of Tables

Table	Title	
5-1	DTU Module Installation	5-7
7-1	Modules Supported on the Interface Cards	7-1
	25-pair Cable Connector Types	9-2
9-1	Pin/Signal Assignment of Universal Card Connectors J1, J2, and J3	9-4
9-2	Pin/Signal Assignment of Universal Card Connectors 11, 12, and 15	9-5
9-3	25-pair Cable Connector Types	9-7
9-4	Pin/Signal Assignment of Universal Card (48 V) Connectors J1 and J3	Ω_Q Q_Q
9-5	Pin/Signal Assignment of Universal Card (48 V) Connector J2	0 10
9-6	LCS Card Connector Types	7-10
9-7	Pin/Signal Assignment of LGS Card (48V) Connector J1	9-11
12-1	Diagnostic Error Codes	12-13
13-1	Contact Ratings for the External Alarm Connector	13-3

## 1. Introduction

This chapter introduces the 3624 MainStreet Intelligent T1 Channel Bank. It describes:

- ☐ the 3624 MainStreet in general
- the system subdivisions

### 1.1 The 3624 MainStreet

The 3624 MainStreet Intelligent T1 Channel Bank can carry a variety of voice and data circuits over high-speed digital transmission lines. It multiplexes up to 24 incoming circuits onto a single T1 (1.544 Mb/s) trunk for access to private or public switched networks or for point-to-point transmission.

The 3624 MainStreet is available in two designs. One design allows the unit to be wall-mounted. The other design is a drawer model that can be installed in a rack shelf assembly unit. Figures 1-1 and 1-2 illustrate the two designs.

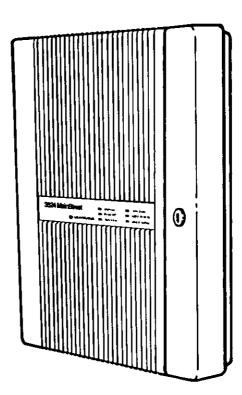


Figure 1-1: 3624 MainStreet Wall-mount Unit, Exterior

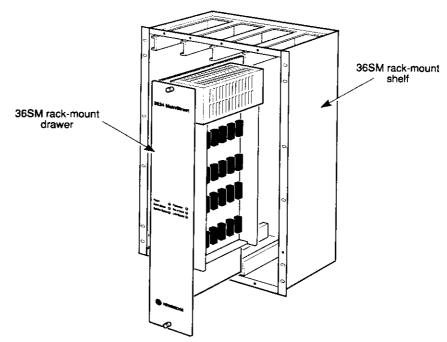


Figure 1-2: 3624 MainStreet Rack-mount Drawer

Each design is available in an AC version and a DC version.

The rack-mounted 3624 has the same functionality, options and operational specifications as its wall-mounted counterpart.

For voice transmissions, the 3624 MainStreet accommodates:

- ☐ Loop/Ground Signalling Subscriber (LGS), via the LGS modules;
- ☐ Loop/Ground Signalling Exchange (LGE), via the LGE modules;
- ☐ E&M (2- or 4-wire) terminations, via the E&M modules; and
- Manual Ringdown (MRD), via the MRD modules; and
- Private Line Automatic Ring (PLAR), via the LGS modules.

For data transmissions, it accommodates:

- RS-232 Direct Connect Modules (DCM),
- □ V.35 Direct Connect Modules.
- ☐ X.21 Direct Connect Modules,
- Office Channel Unit (OCU) modules.
- Digital Network Interface Circuit (DNIC) modules,
- ☐ 4W TO (4 Wire Transmission Only) modules.

### 1.2 3624 MainStreet Sections

The 3624 MainStreet has four major subdivisions:

- the chassis
- ☐ the power supply
- ☐ the Control card
- the Interface card

Figures 1-3 and 1-4 show the subdivisions of the wall-mount unit and the rack-mount drawer.

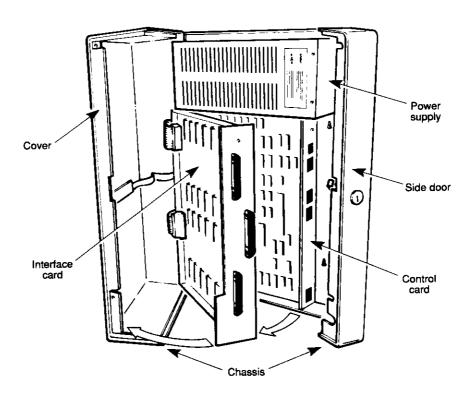


Figure 1-3: 3624 MainStreet (Interior), Wall-mount Unit

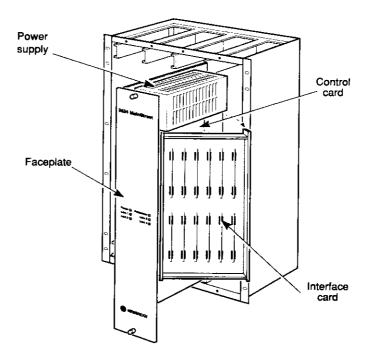


Figure 1-4: 3624 MainStreet (Interior), Rack-mount Drawer

The following descriptions of the four major subdivisions apply to both the wall-mount and the rack-mount designs. When a feature or part is specific to one design, the design type is identified.

### Chassis

The chassis of the wall-mount unit has a cover, a side door, and a mechanical base for the power supply, Control card and Interface card. The cover, hinged on the left, provides access to the Control card and the Interface card. The side door, hinged on the right, provides access to the power switch and power plug and to the indicators and connectors along the edge of the Control card and Interface card. The door can be locked to prevent unauthorized access to the system.

The chassis of the rack-mount drawer has a faceplate and a mechanical base for the power supply, Control card and Interface card.

The Light Emitting Diodes (LEDs) indicate the status of the system, the power, the alarms, the processor and the T1 link. The LEDs on the wall-mount unit are found on the cover while the LEDs on the rack-mount drawer are found on the front faceplate. The operation of all LEDs is described in the Chapter 1, Visual Indicators, in the Maintenance manual.

### Power supply

The power supply is a self-contained unit located at the top of the chassis. It contains an AC/DC or DC/DC converter, an Electromagnetic Interference (EMI) filter, a ringing generator, and a power switch and a fuse module (AC supply) or terminal block and circuit breaker (DC supply).

# Ringing generator

The ringing generator is a part of the power supply. It provides a ringing voltage generator with a 90 V AC output and a maximum power of 7 VA.

The 90 V ringing generator is supplied in 3624 systems with the following part numbers:

	90-0336-11	90-0336-21
_	90-0336-12	90-0336-22
_	90-0337-11	90-0337-21
<u> </u>	90-0337-12	90-0337-22

The 60 V ringing generator is supplied in spare power supplies with the following part numbers:

90-0163-02 90-0164-02

# The Ringing Equivalent Number

The Ringing Equivalent Number (REN) determines the number of devices you can connect to your telephone line and still have the assurance that these devices will ring properly when your number is called.

Calculating the REN: The REN is calculated by summing the REN of all equipment attached to the system or port. If the maximum REN is exceeded, not all of the attached phones can be ringing at the same time. All other functions are unaffected.

With the 90 V ringing generator the maximum allowable Ringing Equivalent Number (REN) is 26 per generator.

The maximum allowable REN is 1 per port for LGS modules with the following part numbers:

90-0156-02
90-0156-06 (manufacturing code B or lower)

For all other LGS modules the REN limit is 5.

### Control card

The Control card is a printed circuit board located at the rear of the chassis, underneath the Interface card. It performs functions common to the entire system and contains the system memory and the T1 interface.

The Control card contains the connectors and posts for the module for T1 support and an optional Resource module. It also provides the ports for connection to the T1 line, the node management terminal, a modem and an external alarm.

The Control card has a seven-segment display, a status LED, and one or two loopback LEDs (only on some versions of the Control card). These indicators display information about card and module status. The LEDs are visible when the side door of the chassis is open on the wall-mount unit. On the rack-mount drawer the LEDs are visible from the rear of the shelf unit.

**Module positions:** A module for T1 support is mounted on the Control card. One of the following modules must be installed on the Control card:

the Line Interface Module (LIM)
the Digital Signal Cross-connect level 1 (DSX-1) module
the Channel Service Unit (CSU) module

In addition, one position on the Control card is provided for an optional Resource module. Resource modules include:

the Dataphone Digital Service (DDS) module the Tone module

Either module can be installed on the Control card but not both at the same time.

**Serial ports:** Connector J4 is an RJ48C connector and is used to connect to the T1 line.

Connectors J5 and J6 are RJ45 RS-232-compatible connectors. Connector J5 is configured as Data Terminal Equipment (DTE) and connector J6 is configured as Data Communications Equipment (DCE).

Connector J7 is an RJ11 connector and is used to connect to an external device for monitoring purposes.

### Interface card

The Interface card is a printed circuit board located at the front of the chassis. It is hinged on the left side so it can swing forward to provide access to the Control card. The Interface card has a single card status LED, visible when the chassis side door is open on the wall-mount unit. On the rack-mount drawer the LED is visible from the rear of the shelf unit.

The Interface card is available in two types: the Universal card and the LGS card. Each interface card supports up to 12 interface modules. The Universal card accommodates all module types. The LGS card accommodates only LGS, LGE and MRD modules.

The Universal Interface card is available in two variants, the Universal card and the Universal card (48 V).

Connections to the customer premises' circuits are made through 50-pin connector(s) located on the faceplate of each respective card.

## 1.3 Installation Summary

Follow the steps below to set up the 3624 MainStreet Intelligent T1 Channel Bank. Refer to the chapters for more detailed information.

	Step	Reference
1.	Choose a location for the 3624 that meets the site requirements.	Chapter 2, Pre-installation Procedures.
2.	Gather the tools and hardware necessary for installation.	Chapters 2, Pre-installation Procedures.
3.	Unpack and inspect the 3624 components.	Chapter 3, Unpacking and Inspecting the Shipment.
4.	Ground the 3624.	Chapter 4, Grounding the 3624 MainStreet.
5.	Install the modules.	Chapter 5, The Control Card Modules; Chapter 6, The Interface Card; Chapter 7, Installing the Interface Card Modules.
6.	Mount the 3624.	Chapter 8, Mounting the 3624 MainStreet.
7.	Connect the external voice and data circuits	Chapter 9, Connecting to External Voice and Data Circuits.
8.	Connect the T1 link.	Chapter 10, Connecting to the Network.
9.	Connect the node management terminal.	Chapter 11, Connecting the Node Management Equipment.
10.	Begin the powering up procedure.	Chapter 12, Powering Up the System.

## 2. Pre-installation Procedures

This chapter describes the requirements and procedures to be considered before the 3624 MainStreet is installed. It includes:

site requirements
power requirements
power requirements
required tools and equipment

### 2.1 Choose a Site

To ensure adequate access to and trouble-free operation of the 3624 *MainStreet*, and to protect the safety of personnel, the requirements outlined below must be met before the 3624 is installed.

One person can install the 3624 wall-mount unit. For ease of installation and personal safety, two people are needed to install the 3624 rack-mount unit.

# Site requirements

The 3624 MainStreet must be installed in a site that is:

clean
 dry (5 to 95% humidity, non-condensing)
 0° to 40°C (32° to 104°F)
 well-ventilated
 well-illuminated
 at least 10 feet (3 m) away from major sources of electromagnetic radiation such as photocopiers and facsimile machines

The unit should be installed where it can easily be connected to the T1 line, voice and data terminations and a power source.

The unit is available in two designs. One design allows the unit to be wall-mounted, on a flat surface such as a plywood panel or on rack-mount brackets. The unit requires twelve inches (30 cm) on either side and in front of the unit, so the cover and side door can open fully. Mount it at a height that permits service personnel to perform maintenance without removing the unit from the wall.

The shelf assembly is designed to be mounted in a 19-inch (48 cm) rack or a 23-inch (58 cm) rack. The rack must be properly installed and stable, for example, bolted securely to the floor. This system requires a minimum of 3 ft. (1 m) clearance in front of and 1.5 ft. (0.5 m) behind the shelf.

Each design is available in an AC version and a DC version.

For mounting instructions, see Chapter 8, Mounting the 3624 MainStreet.

# Power requirements

The 3624 MainStreet is shipped with a 110 V/60 Hz AC or -48 VDC power supply installed.

The AC version meets surge protection requirements as specified in IEEE C62.41 and UL and CSA approved. A power cord is supplied with the AC version. To prevent outages and to minimize surges and drops in power, connect the unit to an non-switched, dedicated power source.

Power consumption depends on the number and type of modules installed. The maximum power consumption is 65 Watts.



DANGER: Do not connect the power yet.

# Grounding requirements

You must connect the 3624 to a building ground point, usually a metal water pipe or building steel. For the wall-mount unit, use a cable that is a minimum of 16 AWG (10 AWG or 12 AWG is recommended) and long enough to connect the grounding stud inside the chassis to the building ground point without splicing.

For the rack-mount drawer, use a cable that is a minimum of 18 AWG and long enough to connect the grounding stud on the rear of the shelf to the building ground point without splicing. Any 3624 drawer in the shelf unit is grounded by its connection to the rack shelf assembly.

For grounding information and instructions, refer to Chapter 4, Grounding the 3624 MainStreet, in this manual.

## 2.2 Required Tools and Hardware

The following tools and hardware are required to install the 3624 MainStreet:

For assembly, you require:

For assembly	For assembly, you require:
	<ul> <li>antistatic wrist strap</li> <li>#1 Philips screwdriver</li> <li>small blade screwdriver</li> <li>integrated circuit (IC) insertion tool for 0.6 inch pin centers, 28-pin dual in-line package (DIP)</li> </ul>
For wall- mounting	For wall-mounting the 3624, you require:  template (supplied in back of this manual)  #2 Philips screwdriver  three #10 x 3/4-inch wood screws (for plywood), or  three #10 x 1-inch screws and anchors (for dry wall), or  one rack-mount kit (19-inch or 23-inch) available from Newbridge
For rack- mounting	For rack-mounting the 3624, you may require any or all of the following kits.  The 36SM Rack Shelf Assembly kit is the common shelf unit used to hold four 3624 rack-mount drawers. The kit contains:  one shelf assembly ne cable support bracket twelve #10-32 x 1/4 in. Philips panhead screws antistatic strap
	The Rack Mount 23-inch Adapter kit allows the shelf assembly to be installed in a 23-inch rack shelf assembly. The kit contains:  two 23-inch rack-mounting brackets twelve #10-32 x 1/4 in. Philips panhead screws  The Rack DC Connector kit is used to distribute DC power to one or more DC drawers installed in the shelf assembly. The kit contains:  one DC power distribution assembly four DC power interconnect cable four male/female hexagonal spacers three #8 crimp-on spade lug one #6 crimp-on ring lug
	one each #6 washer and nut

	The 36SM Rack Blanking Plate kit is used to cover empty unit positions in the shelf assembly. The kit contains:
	<ul> <li>□ one front blanking plate</li> <li>□ one rear blanking plate</li> <li>□ twelve #6 x 1/4 in. Philips sheet metal screws</li> </ul>
For grounding the 3624	For grounding the 3624, you require:
	□ wire stripper □ crimp tool
	□ 5/16-inch nut driver □ 10, 12, 16 or 18 AWG cable
For connecting voice and data	For connecting to external voice and data circuits, you require:
circuits	50-pin connectors and cabling (see Chapter 9, Connecting to External Voice and Data Circuits)
For connecting node	For connecting to node management equipment, you require:
management equipment	<ul> <li>a personal computer with communication software, adapters and cabling (see Chapter 11, Connecting the Node Management Equipment)</li> </ul>
For connecting external	For connecting to external equipment, you require:
equipment	adapters and cabling as required (see Chapter 10, Connecting to the Network, and Chapter 13, Connecting an External Alarm)
For installing the 3624	For installing the 3624, you require the 3624 MainStreet Installation Kit, available from your Newbridge service representative

# 3. Unpacking and Inspecting the Shipment

This chapter provides information on unpacking and inspecting the 3624 components, including:

- antistatic precautions
- unpacking and inspecting the shipment
- repacking the shipment

### 3.1 The Antistatic Wrist Strap

Always wear a properly attached antistatic wrist strap when handling any of the 3624 MainStreet components.

Until the 3624 is properly grounded (refer to Chapter 4, Grounding the 3624 MainStreet, in this manual), other provisions must be made at the unpacking and installation site in order to ground the antistatic wrist strap.

Once the unit is grounded (permanently or temporarily), you may clip the wrist strap to the unit chassis or rack shelf assembly unit.

## 3.2 Unpacking and Inspecting the Shipment

In order to prevent damage to components during transportation, open and inspect the 3624 MainStreet shipping container at the installation site. If you must open the container elsewhere, inspect the components, then carefully repack them in the original container, and move them to the installation site.

The 3624 MainStreet should be unpacked, inspected and assembled on a flat, clean surface such as a workbench or table.



WARNING: Electronic circuitry is easily damaged by electrostatic discharge. Take the following precautions when unpacking and assembling the 3624 MainStreet:

- Always wear a properly attached antistatic strap. See Chapter 4, Grounding the 3624 MainStreet, in this manual for details.
- Before handling any electronic component, touch a grounded metal surface to discharge static from your body.
- Handle the 3624 MainStreet Control and Interface cards and interface modules by the edges only. Do not touch any connectors or components.

# To unpack and inspect the shipment

- 1. Attach an antistatic wrist strap.
- 2. Check each package for any signs of outer damage.
- 3. Unpack and check each package against your order form and packing slip to ensure that all components have been received.

**Basic System Components:** All components are individually packaged and include:

- one 3624 MainStreet chassis (or drawer) containing a Control card, a power supply, a ringing generator, software 6X07, and a display assembly
- one AC power cord for an AC powered system
- one rear blanking plate with #10-32 x 1/4 in. Philips sheet metal screws (3) if the unit is a 3624 rack-mount drawer
- one bag containing warranty cards and keys
- one documentation package

**Optional Components:** Some basic systems may include optional modules which may have been installed before the system shipment. These optional items are packed separately in boxes, labelled for easy identification and include:

- one wall-mount kit if the unit is to be wall-mounted
- one 365M rack shelf assembly kit if the unit is to be rack-mounted
- one LIM, DSX-1 or CSU module
- optional Resource modules (DTU, Tone, DDS)
- one Interface card (Universal card, Universal card (48 V), or LGS card (48 V))
- optional Interface card modules (LGS, LGE, E&M, MRD, 4W TO, OCU, RS-232 DCM, X.21 DCM, V.35 DCM, DNIC)
- 4. Inspect the 3624 MainStreet and all its components, checking for obvious signs of damage during shipping.

- 5. Report any missing or damaged components to your Newbridge sales representative.
- Record the equipment name, part number, manufacturing code and serial number on the inventory form shown in Figure 3-1.

### 3.3 Repacking the Shipment

You should store the packing material in a clean, dry area for use if the unit is ever moved to another location.

If you want to move the unit and the original packing material is not available, place the components to be transported in antistatic bags. Wrap them in several layers of air-cushion material. Place them in a suitable container and surround them with paper or similar non-static packing material. The electronic components must be protected from movement and electrostatic discharges.

### 3.4 Inventory Form

Component Item	Part #	Manufacturing Code	Serial #
	,		
			" "
			-

Figure 3-1: Inventory Form

# 4. Grounding the 3624 MainStreet

This chapter describes the grounding of the 3624 MainStreet. It includes:

grounding the wall-mount unit
grounding the shelf assembly unit
installing the antistatic wrist strap
installing the fuse

### 4.1 About Grounding and Antistatic Precautions

To avoid damaging the 3624, it must be grounded throughout the entire assembly and installation procedures and an antistatic wrist strap must be worn during assembly.

You must connect the 3624 MainStreet to a building ground point, usually a metal water pipe or building steel.



WARNING: Electronic circuitry is easily damaged by electrostatic discharge. Take the following precautions when unpacking and assembling the 3624 MainStreet:

- Always wear a properly installed antistatic wrist strap.
- Before handling any electronic component, touch a grounded metal surface to discharge static from your body.
- Handle the 3624 MainStreet Control and Interface cards and interface modules by the edges only. Do not touch any connectors or components.

### 4.2 Grounding the Wall-mount Unit

To avoid damaging the 3624, it must be grounded throughout the entire assembly and installation procedures.

Connect the 3624 MainStreet chassis to a building ground point, usually a metal water pipe or building steel. The cable used for this ground must be a minimum of 16 AWG (10 or 12 AWG is recommended) and long enough to connect the ground stud inside the chassis to the ground point without splicing.

You can use one of two methods to ground your 3624 if you have an AC power supply. The first method temporarily grounds your unit until you have it permanently mounted. This allows you to use the unit as a ground source for your antistatic strap while you unpack and install your components. The second method permanently grounds your unit.

If your 3624 AC system has Control card, part number 90-0166-04 and you require isolated signal and chassis grounds, follow the procedure described in the sub-section "To ground the 3624 using separate signal and chassis grounds".

If you have a DC power supply, your unit only can be permanently grounded.

T 1	
Loois	required

You require the following tools to ground the 3624 MainStreet:

- wire stripper
- small blade screwdriver
- □ crimp tool
- □ 5/16-inch nut driver
- 10, 12, 14, or 16 AWG cable
- ring lug and/or spade lug

# To temporarily ground your 3624 (AC only)

 Use a small blade screwdriver to pry the fuse holder away from the power section, then pull the holder out.

See Figure 4-1 for the location of the fuse holder and Figure 4-2 for removing the fuse holder.

2. Attach the power cord to the power receptacle (See Figure 4-2 for the location) on the 3624 and to a grounded wall outlet to ground the unit.

The fuse must be reinstalled after you have installed all the interface modules into the unit.

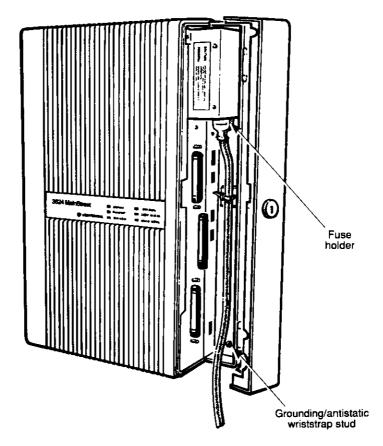


Figure 4-1: Location of the Fuse Holder

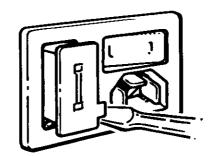


Figure 4-2: Removing the Fuse Holder

## To re-install the fuse

- 1. Remove the AC power cord from the outlet and from the power receptacle on the 3624 MainStreet.
- 2. Swing the Interface card to the left and rest it against the chassis door.
- 3. Replace the fuse holder.
- 4. Swing the Interface card back into place and secure the card to the posts with the screws.



WARNING: Do not re-attach the power cord yet.

- 5. Make sure the 3624 is permanently grounded as described in the following section.
- 6. Re-attach the power cord.

To permanently ground the 3624 using the chassis ground

1. Run a single cable from the building ground point to the grounding stud inside the chassis (see Figure 4-3).

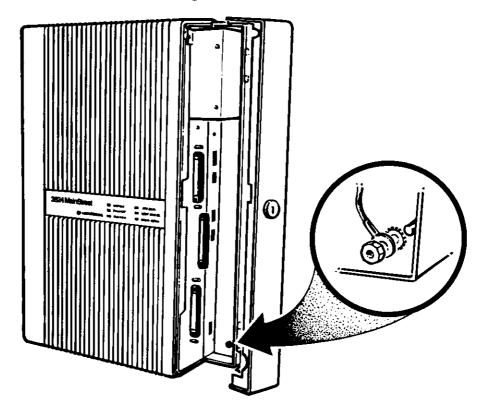


Figure 4-3: Grounding Stud, Wall-mount Unit

2. Using the wire stripper, strip away about 1/4 inch (0.6 cm) of insulation from the cable (see Figure 4-4).

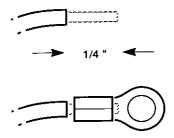


Figure 4-4: Attaching a Ring Lug to the Chassis Ground Stud

- With the crimp tool, attach the ring lug to the cable (see Figure 4-4).
- 4. Attach the cable to the grounding stud, shown in Figure 4-3.
- 5. Tighten the nut to a torque value of 8.5 lbf•in  $\pm 10\%$  (1.0 N•m  $\pm 10\%$ ).

To ground the 3624 using separate signal and chassis grounds

If your 3624 AC system has Control card, part number 90-0166-04 and you require isolated signal and chassis grounds, follow the procedure below. The signal ground cable (14 or 16 AWG recommended) must be long enough to be attached to the signalling/battery ground without splicing.

- 1. Connect the chassis ground as described in the subsection, "To permanently ground the 3624 using the chassis ground".
- 2. Disconnect the two inch ground cable from the ground tap screw located in the upper left hand corner of the Control card and remove the cable from the chassis screw. See Figure 4-5.

The two inch ground cable is no longer required.

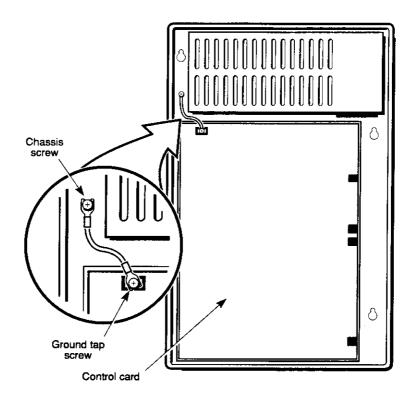


Figure 4-5: Removing the Cable from the Ground Tap Screw

3. Strip 1/4 inch (0.6 cm) of insulation from the end of the signal ground cable.

Crimp a spade lug onto the cable. See Figure 4-6.

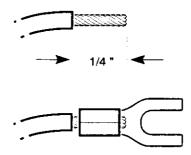


Figure 4-6: Attaching a Spade Lug to the Ground Cable

4. Attach the spade lug to the ground tap screw (#6-32) and tighten the screw to a torque value of 8.5 lbf • in. ±10% (1.0 N • m ±10%). See Figure 4-7.

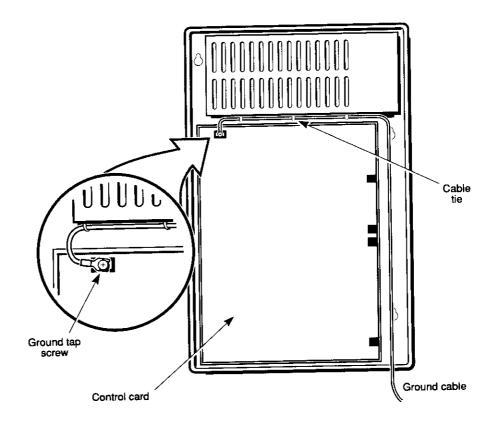


Figure 4-7: Attaching the Cable to the Signal Ground

- 5. Pass the cable between the Control card and the power supply, attaching the cable to the power supply frame with cable ties. See Figure 4-7.
- Attach the other end of the signal ground cable to the signalling/battery ground according to local practises.

### 4.3 Grounding the Rack-mount Shelf

The rack-mount shelf is grounded by connecting a ground stud on the rear of the rack-mount shelf to a building ground point, usually a metal water pipe or building steel. The cable used for this ground must be a minimum of 18 AWG and long enough to connect the ground stud to the ground point without splicing.

AC rack-mount drawers and DC rack-mount drawers are grounded by their connection to the rack-mount shelf.

Once shelf and drawer grounding requirements are met, drawer power connections can be made.

**Tools required** You require the following tools to ground the rack-mount shelf:

- □ wire stripper/cutter
- crimping tool
- ☐ 18 gauge AWG (minimum) cable

# To ground the shelf unit

1. Strip 1/4 inch (0.6 cm) of insulation from the end of the ground cable.

Crimp a ring lug onto the cable (see Figure 4-8).

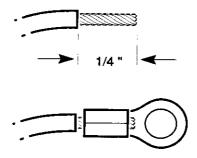


Figure 4-8: Attaching a Ring Lug to the Rack-mount Shelf Ground Cable

2. Locate the shelf ground stud at the rear of the shelf, on the lower left hand side if you are facing the unit (see Figure 4-9).

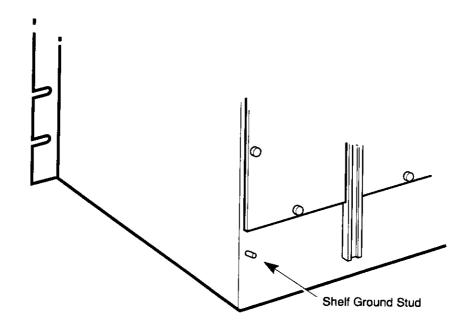


Figure 4-9: Rack-mount Shelf Ground Stud Location

Attach the ground cable to the shelf ground stud with the washer and nut provided (see Figure 4-10).

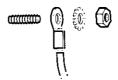


Figure 4-10: Attaching the Cable to the Rack-mount Shelf Ground

Connect the other end of the ground cable to a building ground point, usually a metal water pipe or building steel.

To ground the drawer using separate signal and chassis grounds

If your 3624 AC system has Control card, part number 90-0166-04 and you require isolated signal and chassis grounds, follow the procedure below. The signal ground cable (14 or 16 AWG recommended) must be long enough to pass through the shelf assembly when the drawer is fully extended in order to be attached to the signalling/battery ground without splicing.

- Connect the shelf as described in the subsection, "To ground the shelf unit".
- Disconnect the two inch ground cable from the ground tap screw located in the upper left hand corner of the Control card and remove the cable from the chassis screw. See Figure 4-11.

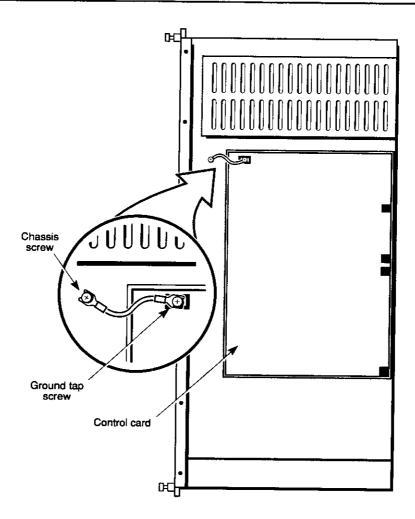


Figure 4-11: Removing the Ground Cable from the Ground Tap Screw

3. Strip 1/4 inch (0.6 cm) of insulation from the end of the signal ground cable and crimp a spade lug onto the cable. See Figure 4-12.

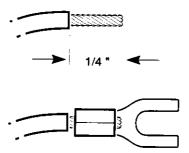


Figure 4-12: Attaching a Spade Lug to the Ground Cable

4. Attach the spade lug to the ground tap screw (#6-32) and tighten the screw to a torque value of 8.5 lbf•in. ±10% (1.0 N•m ±10%). See Figure 4-13.

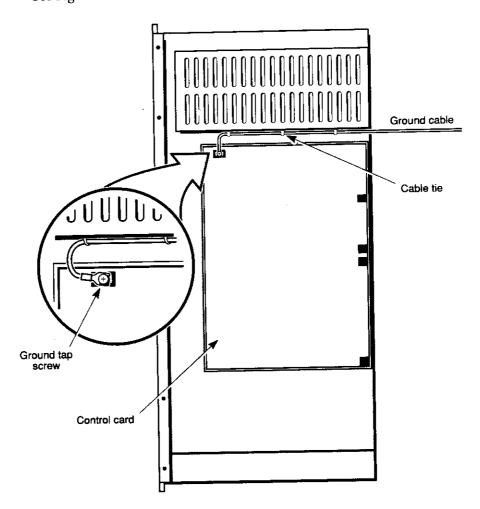


Figure 4-13: Attaching the Signal Ground Cable to Signal Ground

- 5. Pass the cable between the Control card and the power supply, attaching the cable to the power supply frame with cable ties. See Figure 4-13.
- Pass the cable through the shelf assembly and attach the cable to the cable support bracket in a service loop.
- Attach the other end of the cable to the signalling/battery ground according to local practises.

### 4.4 The Antistatic Wrist Strap

To avoid damaging the 3624, an antistatic wrist strap must be worn during assembly. The antistatic strap must **not** be attached to the unit until the unit is grounded.

# For the wall-mount unit

Connect the wrist strap to the stud at the bottom right corner of the 3624 *MainStreet* chassis once the 3624 is grounded. See Figure 4-1 for the location of the ground stud.

# For the rack-mount shelf

Connect the antistatic strap to the stud at the bottom right corner of the front of the rack-mount shelf (when you are facing it) once the rack-mount drawer is installed and grounded. See Figure 4-4.

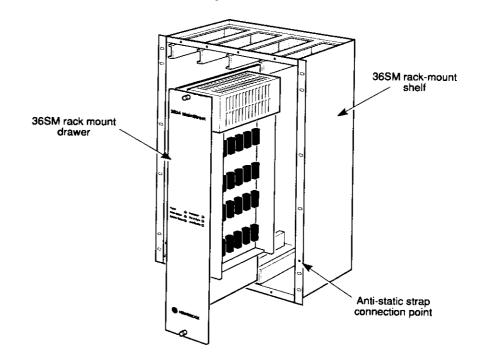


Figure 4-14: Attaching the Antistatic Strap to the Rack-mount Shelf

# 5. The Control Card Modules

This chapter describes the installation of the Control card modules. It includes:

- the Control card and its associated modules
- installing and removing Control card modules

### 5.1 The Control Card

The Control card is a printed circuit board (PCB) located at the rear of the 3624 MainStreet chassis, underneath the Interface card. It is firmly attached to the chassis base. Figure 5-1 shows the Control card on the wall-mount unit.

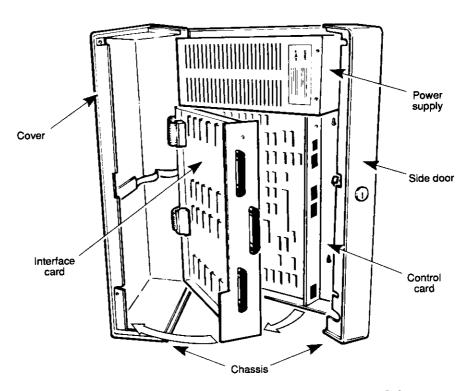


Figure 5-1: Control Card Location in the Wall-mount Unit

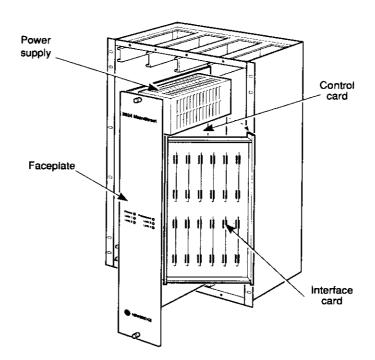


Figure 5-2 shows the location of the Control card on the rack-mount unit.

Figure 5-2: Control Card Location in the Rack-mount Drawer

#### 5.2 The Control Card Modules

The Control card supports the following modules in both the rack-mount and wall-mount designs:

- ☐ the Digital Signal Cross-connect Level 1 (DSX-1) module
- ☐ the Channel Service Unit (CSU) module
- □ the Line Interface Module (LIM) module
- ☐ the Digital Dataphone Service (DDS) module
- ☐ the Data Termination Unit (DTU) modules
- ☐ the Tone module

#### T1 modules

A DSX-1 module, or a CSU module, or a LIM module is required for T1 support.

#### DSX-1 module

The DSX-1 module provides a DSX-1 T1 interface, for connecting T1 equipment together on-premise or for connecting to the DSX-1 side of an external CSU. The DSX-1 module provides standard T1 cross-connections and facilitates loopbacks for the T1 primary rate link. The module does not provide bypass switching.

If you use a DSX-1 module and are connecting to an external T1 link, you need an external channel service unit (CSU).

#### CSU module

The CSU module provides a DS-1 T1 interface, for connecting to T1 lines that run off-premise. The module provides lightning surge protection and fuses on the T1 line. The CSU module converts DS-1 format directly to format that the 3624 can use. The CSU module provides standard T1 cross-connections and facilitates loopbacks for the T1 primary rate link.

If you use a CSU module, you do not need an external CSU.

#### LIMs

The LIM provides a DSX-1 T1 interface, for connecting T1 equipment together on-premise or for connecting to the DSX-1 side of an external CSU. The LIM provides standard T1 cross-connections and facilitates loopbacks for the T1 primary rate link. The module provides bypass switching.

If you use a LIM and are connecting to an external T1 link, you need an external channel service unit (CSU).

The LIM provides the drivers and receivers, coupling transformers and fuses which provide line buffering, impedance matching, isolation and protection.

#### Resource modules

Either a DDS module or a Tone module can be installed but not both at the same time.

#### Tone module

The optional Tone module is equipped with one DSP (Digital Signal Processor) circuit and the software PROMs to generate a ringback tone for operation with LGS modules programmed as PLAR, LS\_EM, or GS\_EM. This module may be required as an interface with MegaCom800.

#### DDS module

The optional DDS module is equipped with two DSPs and software PROMs to generate the ringback tone as described above and to provide rate adaption for Newbridge's proprietary HCM (High Capacity Multiplexing) data format to industry-standard DDS format. This module is required to provide rate adaption for data equipment using non-DDS data format to DDS network services.

#### DTU module

The DTU module is an optional integrated circuit (IC) module. It allows communication with the 4600-series MainStreet network manager software over the primary rate link and controls the D-channels of any connected DTUs. A DTU module is required for a DNIC module. It is not required for an RS-232 DCM, a X.21 DCM, or a V.35 DCM.

### 5.3 Installing a Control Card Module

You must install either a DSX-1 module, a CSU module or a LIM for connection to the external network.

The DDS and Tone modules are optional resource modules. You may install either a DDS or a Tone module, but not both.

The DTU module is installed depending upon the needs of your system. See section 5.6, "Installing a DTU Module", in this chapter.

The procedure for installing the Control card module(s) is the same for both the wall-mount and the rack-mount units.

Figure 5-3 shows the location of the connectors and mounting posts for each module on the Control card.

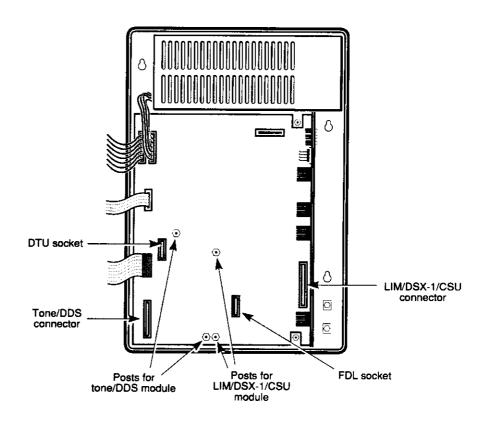


Figure 5-3: Location of the Modules on the Control Card

Each module has a female connector that is inserted into a male connector on the Control card. The modules are secured to mounting posts on the Control card with screws. The holes in the modules should line up with the mounting posts. If they do not, you are installing the wrong module on that connector.



WARNING: The system must be powered down before you install or remove a Control card module.

#### Tool required

#1 Philips screwdriver

#### To install a Control card module

- 1. Ensure that the power is off.
- 2. Remove the screws from the posts on the Control card.
- 3. Hold the module by the edges with the female connector facing down.
- 4. Align the female connector of the module with the appropriate male connector on the Control card and the holes in the module with the posts on the Control card (see Figures 5-3 and 5-4).

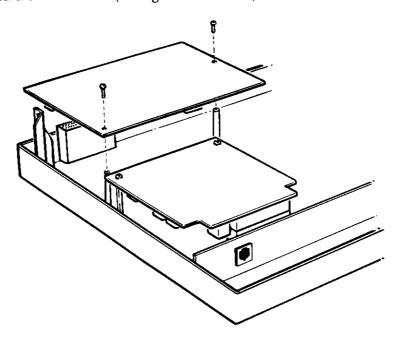


Figure 5-4: Installing a Control Card Module

5. Push down on the edge of the module nearest the female connector.

Do not force an uncooperative module as you might bend the pins on the male connector.

6. Screw the module to the mounting posts.

#### 5.4 Removing a Control Card Module

# To remove a Control card module

- 1. Ensure that the power is off.
- 2. Remove the screws, from the mounting posts, that are holding the module in place.
- 3. Holding the module by the edges close to the connector, gently pull the module off the card.
- 4. Reinsert the screws into the posts.

#### 5.5 Setting the Line Build-out

If you have a CSU module with a three-position slide switch, set the Line Build-out (LBO) using the switch. The possible settings are 15, 7.5 and 0 dB.

If your CSU module does not have this switch, the LBO is software-configurable (see Chapter D1, T1 Module Operating Parameters, in the Configuration manual).

### 5.6 Installing a DTU Module

The DTU module is an optional integrated circuit (IC) module. It allows communication with the 4600-series MainStreet network manager software over the primary rate link and controls the D-channels of any connected DTUs.

The procedure for installing a DTU model is the same for the wall-mount and the rack-mount units.



NOTE: A DTU module is required for a DNIC module. It is not required for an RS-232 DCM, a X.21 DCM, or a V.35 DCM.

Determine from Table 5-1 whether you need a DTU module in the DTU socket and/or the FDL socket. See Figure 5-3 for the location of the sockets.

Table 5-1: DTU Module Installation

If you plan to	Install a DTU Module in the
use DNIC modules	DTU socket
communicate with a 4600-series network manager via a 64 kb/s channel on the T1 link	DTU socket
communicate with a 4600-series network manager via the Facility Data Link (FDL) on the T1 link	FDL socket



WARNING: The system must be powered down before you install or remove a Control card module.

#### Tool required

IC insertion tool for 0.6 inch pin centers, 28-pin dual in-line package (DIP)

# To install a DTU module

1. Pick up the DTU module with the IC insertion tool.

Note which way the notched end of the module is facing.

2. Align the module's pins with the socket on the Control card.

Ensure the notched end of the module is inserted into the notched end of the socket (see Figure 5-5).

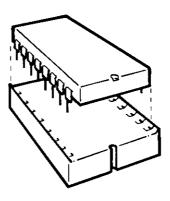


Figure 5-5: Installing a DTU Module

3. Make sure the tip of every pin is resting in the proper hole in the socket.

Otherwise the pins may bend or break when you push the module all the way down.

4. Push down on the knob on top of the IC insertion tool until the pins of the module snap into the socket.

Do not force an uncooperative module as you might bend the pins.



WARNING: If you insert a module the wrong way, it will be damaged when the unit is powered up.

Tool required

IC extraction tool

**To remove a DTU** 1. Position the extraction tool over the DTU module as shown in Figure 5-6. module

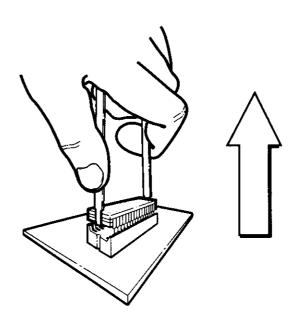


Figure 5-6: Removing a DTU Module

- 2. Grasp the DTU module firmly.
- 3. "Rock" it out of the socket, lifting one end first, then the other.

# 6. The Interface Card

This chapter describes the Interface card and its installation into the 3624 MainStreet. It includes:

- the Interface card variants
- ☐ installing the Interface card

### 6.1 Interface Card Variants

The Interface card is a PCB located at the front of the chassis. The Interface card covers the Control card when the Interface card is installed. Figures 6-1 and 6-2 show the Interface card of the wall-mount unit and the rack-mount drawer, respectively.

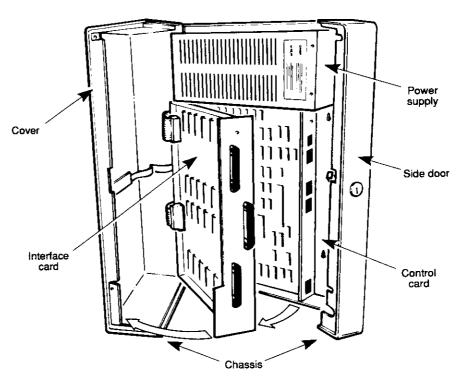


Figure 6-1: Location of the Interface Card in the Wall-mount Unit

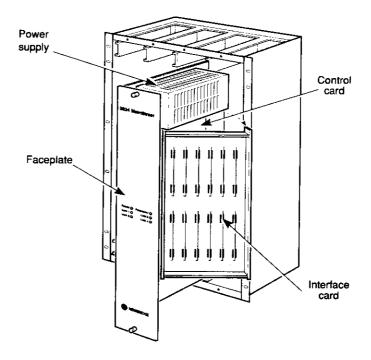


Figure 6-2: Location of the Interface Card in the Rack-mount Drawer

The Interface card is available in three variants for installation in the wall-mount and rack-mount units:

- the Universal card
- ☐ the Universal card (48 V)
- □ the LGS card (48 V)

Only one of the three variants of the Interface card is installed in any 3624.

Each Interface card variant has 12 positions for module interfaces. Power and ringing voltage are provided to the Interface card variants through direct connection to the Control card.

The Universal cards have three 50-pin connectors for connections to external voice and data circuits. The LGS card has one 50-pin connector for external connections to external voice circuits.



WARNING: Power down the system before you install or remove the Interface card.

### 6.2 Installing the Interface Card

The procedure to install the Interface card is the same for all variants. The procedure below applies to both the wall-mount and rack-mount units; the illustrations show the wall-mount unit.

#### To install the Interface card

- 1. Lay the unattached ends of the Control card's power cable and the ribbon cable so they are not covered by the Interface card. (See Figure 6-3.)
- 2. Hold the Interface card as shown in Figure 6-3, with the four rows of male connectors facing you and the 50-pin connector(s) under your right hand.

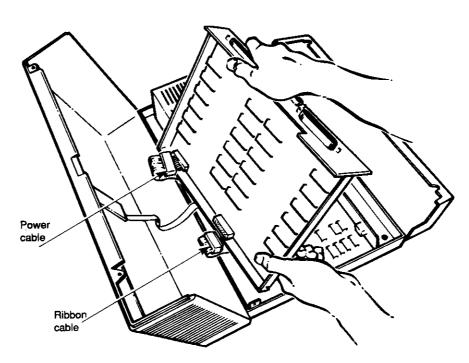


Figure 6-3: Installing the Interface Card

- Insert the pin on the lower left corner of the Interface card into the hole of the lower support on the chassis. See Figure 6-3.
- 4. Gently lift up on the upper support on the chassis (below the power supply and insert the pin on the upper left corner of the Interface card into the hole of the upper support.

Gently push the card toward the upper support.

The interface card should swing easily on the supports.

5. Screw the Interface card to the posts with the captive screws (see Figure 6-4).



NOTE: If you removed the fuse to ground the unit, do not screw the Interface card to the posts at this point. Finish installing the Interface card, then remove the power cord and replace the fuse.

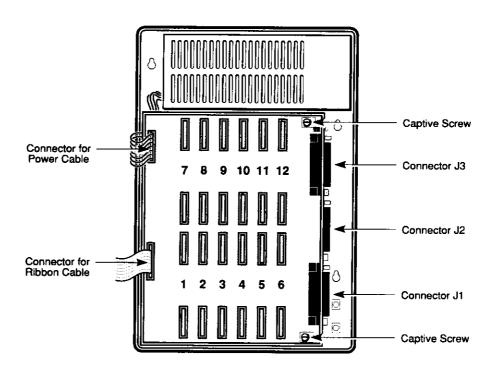


Figure 6-4: Interface Card Cable Connections and Captive Screws

6. Plug the Control card's power cable into the Interface card (see Figure 6-4).

Do not twist the cable.

7. Plug the Control card's ribbon cable into the Interface card (see Figure 6-4).

Do not twist the cable. Push down until the tabs on the connector snap on.

# 7. Installing the Interface Card Modules

This chapter describes the modules that are installed on the Interface card(s). It includes:

- the modules for the variants of the Interface cards
- installing and removing the modules
- affixing the module part number label
- installing and removing the filler module

## 7.1 Modules Supported by Each Interface Card Type

Each variant of the Interface card supports the modules as listed in Table 7-1.

Table 7-1: Modules Supported on the Interface Cards

	Interface Card			
Module	Universal	Universal (48 V)	LGS	
LGS	٧	٧	√	
LGE	V	V	٧	
E&M	7	٧	-	
4W TO	V	V	-	
MRD	V	V	v.	
DNIC	V	vi .	-	
ocu	V	v	-	
RS-232 DCM	V	7	-	
X.21 DCM	V	٧	-	
V.35 DCM	v	√.		

#### 7.2 Module Positions on the Interface Card

All three variants of the Interface card have 12 positions for modules with each position consisting of two male connectors. See Figure 7-1.

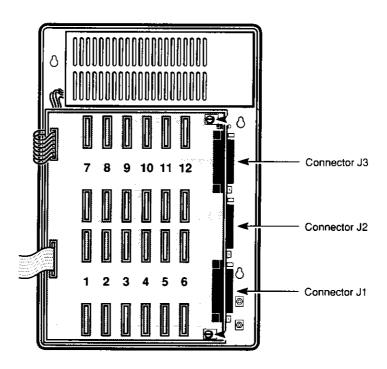


Figure 7-1: Location of Interface Card Module Positions

Any module can be installed in any position; however, when X.21 DCMs and V.35 DCMs are configured for super-rate interface speeds, they must be placed in specified positions depending upon the chosen super-rate speed. See section F3.11, "Super-rate Circuits", in the Configuration manual for more information.

To assist in the connection of external circuits (described in Chapter 9, Connecting to External Voice and Data Circuits, in this manual) and the configuration of the 3624 MainStreet (described in the Configuration manual), we recommend you fill out the appropriate node configuration forms (found in the Node Configuration Forms manual).

## 7.3 Installing and Removing the Interface Card Modules

Each Interface card module is a printed circuit board with two female connectors. The modules are installed on the Interface card. The following procedures apply to both the wall-mount and rack-mount units.



NOTE: The module is not properly seated if any LEDs on the module light up after the module is installed and it has not been configured.

# To install a module

1. Hold the module by the plastic tabs so the two female connectors point towards the Interface card and the surface of the module without any components on it, faces left (towards the chassis cover).

Hold the module perpendicular to the Interface card (see Figure 7-2).

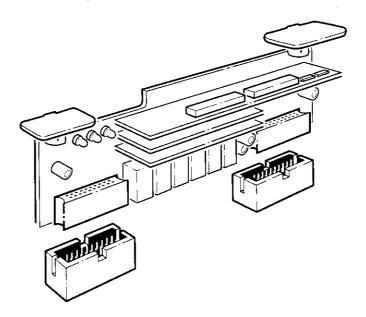


Figure 7-2: Installing an Interface Card Module

2. Align the two female connectors on the module with the two male connectors on the Interface card.

Align the upright edges of the module with the slots in the shrouds.

3. Gently push the female connectors part way onto the male connectors.

Check that each pin is inserted into the proper position. Otherwise the pins might bend or break when you push the module in all the way.

- 4. Push down on the upper corners until the module is installed.
  - Do not force an uncooperative module as you might bend the pins on the male connectors.
- 5. Repeat the procedure for each module.

## To remove a module

The module extraction tool is a thin, tapered plastic stick with a notched hook at one end. One module extraction tool is packaged with each six-pack of modules and two are included in the 3624 MainStreet Installation Kit.

 Place the notched end of the tool flush against the outside edge of one of the male connector shrouds so that the notch hooks under the module's PCB (see Figure 7-3).

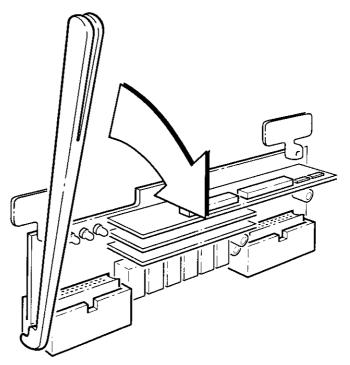


Figure 7-3: Using the Module Extraction Tool

- 2. Move the top of the tool away from the module to lever the PCB out of the shroud, as shown in Figure 7-3.
- 3. Repeat steps 1 and 2 at the other end of the module.
- 4. Use the plastic tabs to gently lift it off the Interface card.

Make sure none of the pins in the male connectors are bent.

### 7.4 Affixing the Module Part Number Label

Each module has a part number label that can be used to keep an accurate record of the marketing part number and the manufacturing code. The label contains the marketing part number (an 8-digit number starting with 90-) and manufacturing code (a single letter) as shown in Figure 7-4.

90-1111-22/B

Figure 7-4: Sample of a Part Number Label

# To affix the part number label

- Locate the label packaged with the module. Keep this label with the module until the module is installed.
- 2. Ensure that the marketing part number on the of the module's printed circuit board matches the marketing part number on the label.

Figure 7-5 shows where the part number is located on a voice (and data) module. On other type of modules (LIM, CSU, DSX-1, Tone or DDS modules) the part number is located on the solder side of the module. On the 3624 Control card and Interface card, the part number is located on the card's metal faceplate.

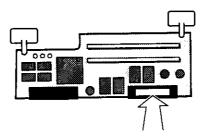


Figure 7-5: Locating the Part Number on a Voice Module

- 3. Install the module.
- 4. Affix the label to the appropriate position on the system configuration panel located on the left hand side of the chassis cover, see Figure 7-6.
- 5. Record the module's part number and manufacturing code on the inventory form used to record the information on system components. The inventory form is found in Chapter 3, on page 3-4 in this manual.

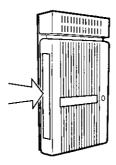


Figure 7-6: System Configuration Panel

**6.** If you are removing or replacing a module, remove its label from the system configuration panel and remove its part number from the inventory form.

### 7.5 Installing and Removing the Blank Modules

The blank module is a plastic module (see Figure 7-7) that is installed in the module position(s) on the Universal Interface card when super-rate circuits on V.35 and X.21 DCMs are cross-connected to T1 circuits. The installed blank module prevents the installation of another interface module type into a position that is being used in a super-rate connection.

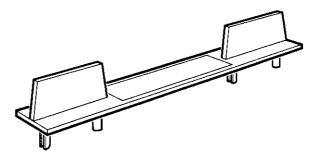


Figure 7-7: The Blank Module

Super-rate circuits are circuits that allow data interface speeds up to 1344 kb/s. The super-rate interface speeds are supported on V.35 and X.21 DCMs when the circuits are configured for transparent rate adaption.

One module position is required for each two T1 circuits. For example, if six T1 circuits are required, three module positions are needed. The DCM is installed in the first available module position on the Universal Interface card and two blank modules are installed in the next two module positions. See section F3.11, "Super-rate Circuits", for determining the module positions to be used for the DCM module and the blank module.

# To install the blank module

- 1. Hold the module by the plastic tabs so the two plastic posts face downwards and the surface with the yellow caution label faces upwards.
- 2. Hold the module perpendicular to the Interface card.

See Figure 7-8.

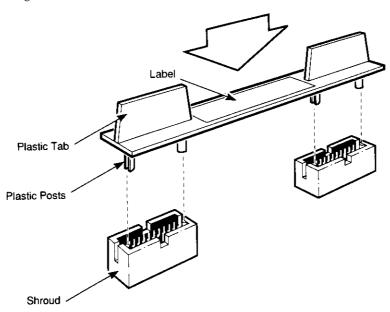


Figure 7-8: Inserting the Blank Module

Align the two plastic posts on each side of the module with the two male connectors of the module position.

Align the upright edges of the module with the slots in the shrouds.

- 4. Gently push the plastic posts part way onto the male connectors.
- 5. Push down on the upper corners of the module until it is installed.

Do not force an uncooperative module as you might break the plastic posts.

# To remove the blank module

1. Grasp the two plastic tabs on the modules and lift the blank module out.

# 8. Mounting the 3624 MainStreet

The	3624 MainStreet is designed to be mounted:
0	on a wall in a shelf assembly on a rack

#### 8.1 Mounting the 3624 on a Wall

The 3624 MainStreet is designed to be mounted vertically on a wall, preferably on a flat surface such as a plywood panel or dry wall. It also can be mounted vertically in a 19-inch (48 cm) or 23-inch (58 cm) rack using rack-mount brackets.

Mount the 3624 MainStreet at a height that permits service personnel to perform maintenance without removing the unit from the wall. Leave twelve inches (30 cm) of space on either side and in front of the unit, so the cover and side door can open fully.



WARNING: Do not mount the unit on an uneven surface such as a concrete wall as this might damage the chassis.

## To mount the system on a wall

#### Tools required:

- template (supplied in the back of this manual)#2 Philips screwdriver
- three #10 x 3/4-inch round head wood screws (for plywood) or
- three #10 x 1-inch screws and anchors (for dry wall)
- 1. Choose a location for the 3624 MainStreet, which fits the site requirements described in Chapter 2, Pre-installation Procedures, in this manual.
- 2. Position the template on the wall where you plan to install the unit.

Mark the position of the three screw holes. Remove the template.

**3a.** For a plywood panel, fasten the screws into the plywood panel, letting the screws protrude 1/8-inch (3.2 mm), (see Figure 8-1).

**3b.** For dry wall, install the anchors and fasten the screws into the anchors letting the screws protrude 1/8-inch (3.2 mm), (see Figure 8-1).

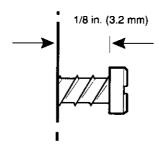


Figure 8-1: Placement of the Mounting Screws

- 4. Close the chassis cover and side door of the 3624.
- 5. Hold the back of the unit against the wall (plywood or dry wall) and align the round part of the keyholes in the chassis with the head of the screws.

Gently fit the head of the screws through the keyholes.

- 6. Slide the unit down until the tops of the keyholes rest on the screws.
- 7. Open the chassis cover and side door of the 3624.
- 8. Tighten the screws until the unit is securely held against the wall (plywood or dry wall).

# To mount the system on rack-mount brackets

#### Tools required:

- □ #2 Philips screwdriver
- template (supplied in the back of this manual)
- one rack-mount kit (19-inch or 23-inch) available from Newbridge, which includes 2 rack-mount brackets and eleven #10-32 x 1/2-inch pan head screws
- 1. Attach the two rack-mount brackets on a 19-inch rack (or 23-inch rack) with eight of the pan head screws.

Figure 8-2 shows the position of the brackets on the rack.

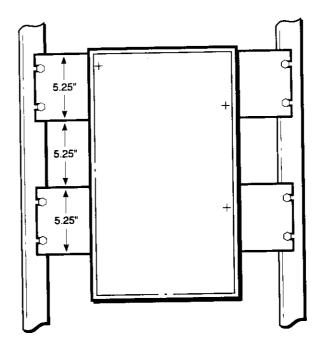


Figure 8-2: Rack-mount Bracket Position

 Partially thread the remaining three mounting screws into the appropriate holes in the brackets, allowing the screws to protrude 1/8inch (3.2 mm) as shown in Figure 8-1.

The template in the back of this manual shows the position of the 3624 MainStreet mounting holes.

- 3. Close the chassis cover and side door of the 3624.
- Hold the back of the unit against the brackets and align the round part of the keyholes in the chassis with the heads of the screw.

Fit the heads of the screws through the keyholes.

- 5. Slide the unit down until the tops of the keyholes rest on the screws.
- 6. Close the chassis cover and side door of the 3624.
- 7. Tighten the screws until the unit is held securely against the brackets.

#### 8.2 Mounting the 3624 in a Shelf Assembly in a Rack

The 3624 rack-mount drawer has the same functionality, options, and operation specifications as its wall-mounted counterpart. The 3624 drawer includes a power supply with a ringing generator, a Control card and an Interface card.

Up to four 3624 drawers can be inserted into a 36SM (Small Multiplexer) rack-mount shelf assembly. It provides mechanical support, grounding, and DC power distribution (with the addition of a Rack DC Connector kit) for DC units.

The shelf assembly can be attached to a standard 19-inch (48 cm) or 23-inch (58 cm) rack. The rack must be properly installed and stable, for example, bolted securely to the floor. Two shelf assemblies can be installed in a standard 7 ft. (2.75 m) rack. The shelf assembly requires a minimum clearance of 3 ft. (1 m) in front of and 1.5 ft. (0.5 m) behind it.

To protect against the effects of electromagnetic interference (EMI), front and rear blanking plates are attached in any empty drawer positions. A small rear blanking plate (supplied with the 3624 rack-mount drawer) is attached to the lower one-third of the shelf unit for any installed rack-mount drawer.

If you require a rack-mount shelf assembly, contact your Newbridge sales representative.

# Shelf components

The 36SM Rack Shelf Assembly kit is the common shelf unit used to hold any four 36SM rack mount drawers. This kit includes:

	shelf assembly (1)
_	cable support bracket (1)
<b></b>	twelve #10-32 x 1/4 in. Philips panhead screws
	antistatic stran

Figure 8-3 illustrates one 3624 drawer in the rack-mount shelf.

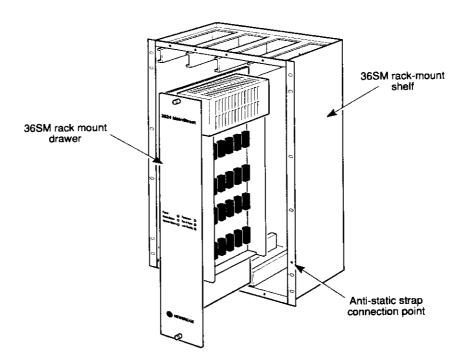


Figure 8-3: Rack-mount Shelf and a 3624 Drawer

Each 36SM rack-mount shelf is shipped with eight slides already installed (one slide on the top and the bottom for each of the four drawer positions).

Each slide is made up of a shelf member and a removable drawer member (see Figure 8-4). Initially, the drawer members are installed in the shelf members. The drawer members must be removed and attached to the drawers to be installed.

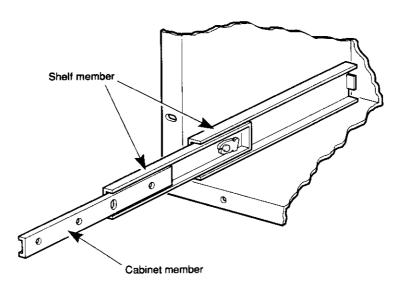


Figure 8-4: Drawer and Shelf Members

#### Blanking plates

To protect against the effects of electromagnetic interference (EMI), front and rear blanking plates are installed over any empty drawer position. The 36SM Rack Blanking Plate kit includes:

- ☐ front blanking plate (1)
- rear blanking plate (1)
- □ twelve #6 x 1/4 in. Philips sheet metal screws

## Rack conversion kit

The Rack Mount 23-inch Adapter kit is used to allow the shelf assembly to be installed in a 23-inch rack. It includes:

- □ 23-inch rack-mounting bracket (2)
- $\Box$  #10-32 x 1/4 in. Philips panhead screws (12)

# To install the shelf in a 19-inch (48 cm) rack

- 1. Remove all packing material from the shelf.
- 2. Ensure that the rack is securely bolted to the floor.
- 3. Have one person hold the shelf in position on the mounting brackets while the second person loosely installs the mounting screws (see Figure 8-5).

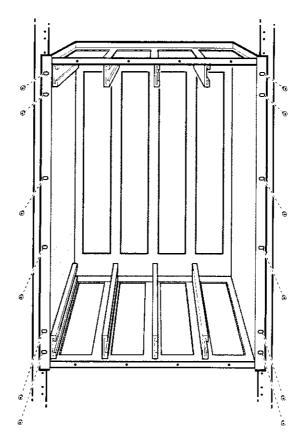


Figure 8-5: Installing the Shelf in a 19-inch (48 cm) Rack

4. Tighten the mounting screws to secure the shelf to the rack (see Figure 8-5).

# To install the shelf in a 23-inch (58 cm) rack

- Remove all packing material from the shelf.
- 2. Set the shelf on a firm flat surface.
- 3. Position a rack-mounting bracket behind a shelf flange (see Figure 8-6) and align the holes on the rack-mounting bracket with the holes on the shelf flange.

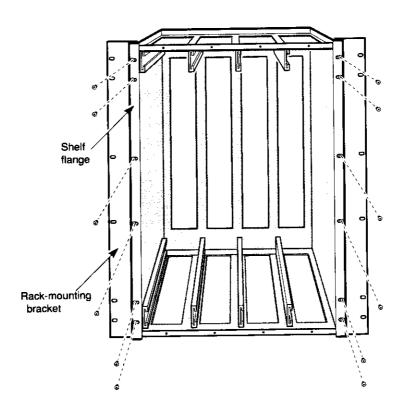


Figure 8-6: Attaching the 23-inch (58 cm) Rack-mounting Brackets

- 4. Secure the bracket to the shelf flange with the screws included with the bracket (see Figure 8-6).
- 5. Repeat Steps 3 and 4 for the other side of the shelf.
- 6. Ensure that the rack is securely bolted to the floor.
- 7. Have one person hold the shelf in position while the second person loosely installs the mounting screws (see Figure 8-7).

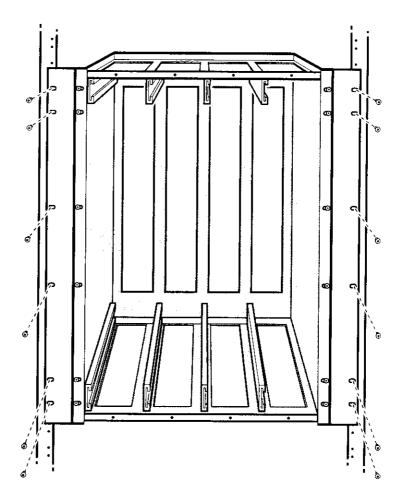


Figure 8-7: Installing the Shelf in a 23-inch (58 cm) Rack

8. Tighten the mounting screws to secure the shelf to the rack.

# To install a drawer into a shelf

- 1. Choose one of the drawer positions in the shelf.
- 2. Pull the shelf and drawer members out (top and bottom) until they lock into position (see Figure 8-8).

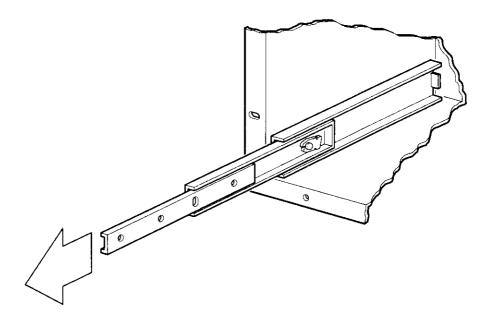


Figure 8-8: Pull-out Drawer and Shelf Members

3. Depress the drawer member tabs (top and bottom) while pulling the drawer members free of the shelf members (see Figure 8-9).

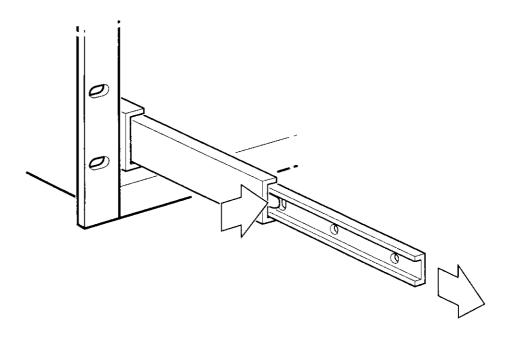


Figure 8-9: Depressing the Drawer Member Tab



NOTE: For optimum fit, keep the drawer and shelf member pairs together.

4. If a shelf member is in the way, center the shelf member latch while pushing the shelf member back into the shelf (see Figure 8-10).

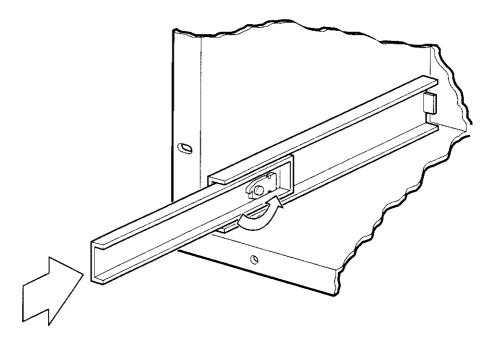


Figure 8-10: Shelf Member Latch

- 5. Remove the three  $\#6-32 \times 1/4$  in. screws already installed in the drawer member mounting positions (see Figure 8-11). Keep the screws.
- 6. Orientate the drawer members as shown in Figure 8-11. Secure the drawer members with the screws removed in Step 5.

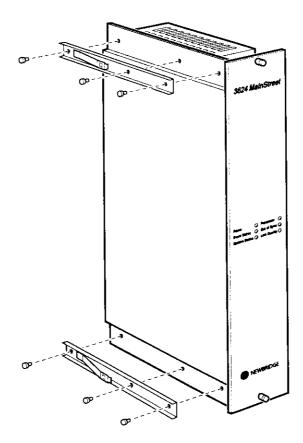


Figure 8-11: Attaching Drawer Member to the Drawer

- 7. Ensure that the shelf members are fully extended (see Figure 8-12).
- 8. Align the drawer members with the shelf members (see Figure 8-12).

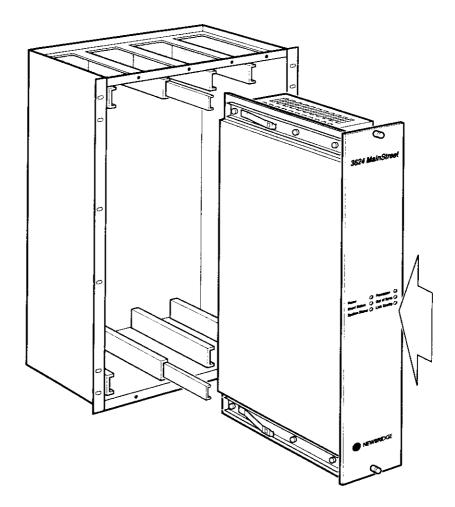


Figure 8-12: Aligning Drawer Members with Shelf Members

- 9. Push the drawer in until the drawer members lock into position.
- 10. Depress the drawer member tabs (top and bottom) while pushing the drawer all the way into the shelf (see Figure 8-13).

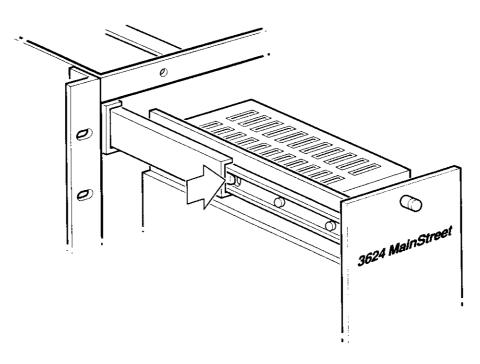


Figure 8-13: Drawer Member Tab



NOTE: The drawer member may offer some resistance the first time it is inserted. This is normal.

11. Secure the drawer to the shelf with the captive screws on the drawer faceplate.

To attach the rear blanking plate for an installed drawer

Once you have installed the 3624 rack-mount drawer, attach the small rear blanking plate, included with the drawer, to the shelf assembly.

1. Align the holes in the rear blanking plate with the holes on the rear of the shelf for the 3624 rack-mount drawer's shelf position (see Figure 8-14).

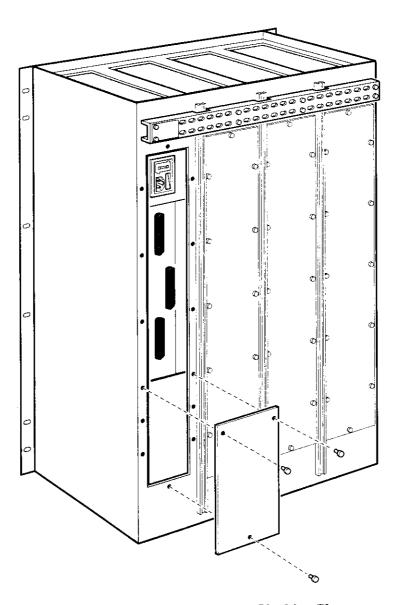


Figure 8-14: Attaching the Rear Blanking Plate

**2.** Secure the blanking plate to the rear faceplate with the screws provided.

To attach empty drawer position blanking plates If no more drawers are to be installed in this shelf, install front and rear blanking plates for any empty drawer positions.

 Align the captive screws on the front blanking plate with the holes on the front of the shelf for the empty drawer position (see Figure 8-15).

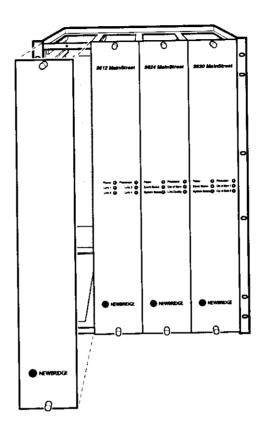


Figure 8-15: Attaching the Front Blanking Plate

- 2. Secure the front blanking plate to the shelf with the captive screws.
- 3. Align the holes in the rear blanking plate with the holes on the rear of the shelf for the empty drawer position (see Figure 8-16).

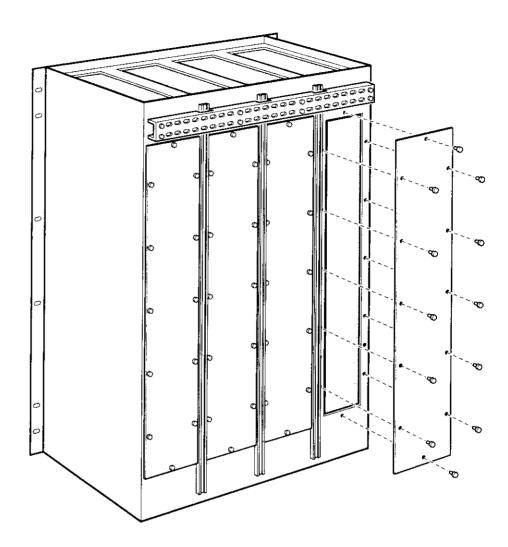


Figure 8-16: Attaching the Rear Blanking Plate

4. Secure the rear blanking plate to the shelf with the screws provided.

9.1

# 9. Connecting to External Voice and Data Circuits

Th	his chap	er describes the externa	s the connecte Il voice and d	ors on the Ir lata circuits.	nterfa It is	ace cards that are used to ncludes:
000	the c	onnectors fo	or the two Ur or the LGS Intait connection ait connection	terface card as for wall-n	noun	e cards variants nted units nted drawers
Overview o	of the	Universa	l Interface	Cards		
c	onnecto	voice and d rs on the Ur in two var	uversal Interi	re connecte face card. T	d to The U	the 3624 MainStreet via the Jniversal Interface card is
_		Universal c Universal c				
т	Interface	Card" The	s described in Universal ca Universal Into	ard (48 V) 19	aes	onnecting to the Universal scribed in section 9.3, V)".
7	Power a	nd ringing v	rface card va voltage are prection to the (	rovided to t	ne C	itions for module interfaces. Iniversal card variants
1	the conr	e 50-pin cor ections for t J1, J2 and J3	the external v	g the outer o	edge ta cir	of the two variants provide rcuits. The connectors are
	For the rack-mo	ack-mount unt shelf.	drawer, the 5	0-pin conne	ector	s are found at the rear of the
	The opt external variants	circuits thr	le interfaces t ough the con	hat can be i nectors on t	nstal the L	lled and connected to Jniversal Interface card
	_	S			00000	OCU RS-232 DCM X.21 DCM V.35 DCM DNIC

### 9.2 Connecting to the Universal Interface Card

On the Universal Interface card, connectors J1, J2 and J3 carries the signals for module positions as shown in Figure 9-1.

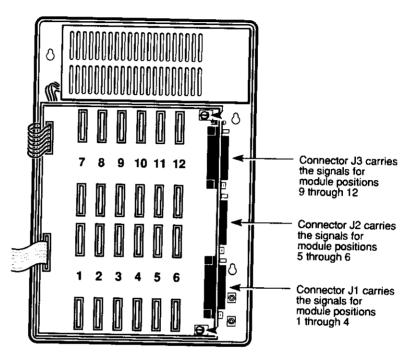


Figure 9-1: Module Position/Connector Assignment for the Universal Card

Record the module type installed in each position on the node configuration forms in the Node Configuration Forms manual.

The 25-pair cable for connecting the connector on the Universal Interface card to the external voice and data devices requires the connector type that is listed in Table 9-1 and illustrated in Figure 9-2 for the wall-mounted units. A 25-pair cable is also available from Newbridge and is listed in the Ordering Information manual. The type of connector used with the rack-mount drawer is described in section 9.5, "Connecting to the Rack-mounted Drawer".

Table 9-1: 25-pair Cable Connector Types

	Canada	U.S
Universal	CA2GA	RJ2GX

The two variants of the OCU module, OCU-I (90-0693-01) and OCU-II (90-0693-02), do not have the same pin/signal assignment; therefore, they are not interchangeable on the Universal Interface card.

The RS-232 DCM connects to external DCE or DTE equipment through one of the three 50-pin female connectors. You must connect the signals to an intermediate distribution panel (punch-down block) and then to the RS-232 distribution panel (available from Newbridge) in order to convey the signals from the 3624 system to industry standard DB-25 interfaces.

#### To connect to the external circuits

1. Attach one end of a 25-pair cable to the male 50-pin connector on the Universal Interface card so that the cable exits from the bottom of the 3624 MainStreet without being bent. See Figure 9-2.

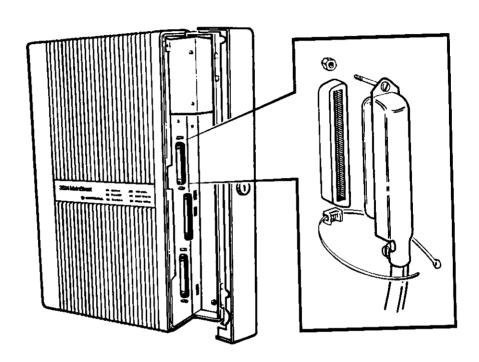


Figure 9-2: Interface Card Connector Orientation

Attach the other end of the 25-pair cable to the appropriate device.

Table 9-2 shows the pin/signal assignment of connectors J1, J2 and J3 for the module positions and module types installed on the Universal Interface card. The pin/signal assignments apply to Universal Interface card (90-0154-05), an earlier version of the Universal Interface card (90-0154-01) for the wall-mounted units, and the Universal Interface card (90-0154-06) for the rack-mount drawer.



NOTE: The standard pair colours are read <first colour> on <second colour>, the second colour being the prominent one. For example, pin #26 is W-BL and is read as 'white on blue'.

Table 9-2: Pin/Signal Assignment of Universal Card<sup>1</sup> Connectors J1, J2, and J3

	<del></del>						Mod	dule Type			
Pin	Pair Colour <sup>2</sup>	Module Position	Circuit Number	LGS LGE MPD	E&M	4W-TC OCU-I (02)		OCU- (01)		X.21 DOM	V.35
26	W-BL		1	T1	<b>T</b> 1	Ti	Line+	T1	CTS1	T(B)	TxDB
1	BL-W		ĺ	R1_	Rt	Rt	Line-	∣ <del>R</del> 1	TXD1	T(A)	TxDA
27 2	W-O	ļ		NC3	TR1	TR1	NC	T2	RXD1	R(B)	RxDB
20	O-W			NC NC	RR1	RR1	NC	F2	XCLK1	R(A)	RxDA
28 3	W-G	1 .	ļ	NC	E1	NC	NC	NC	RTS1	S(A)	SCTA
	G-W			NC	MI	NC	NC	NC	SCR1	S(B)	SCTB
29	W-BR	1, 5, 9	2	T2	T2	T2	NC	TR1	CTS2	C(A)	RTS
4	BR-W			R2	R2	R2	NC	RR1	TXD2		CTC
30	W-S			NC	TR2	TR2	NC	TR2	RXD2	C(B)	CTS SCRA
5	S-W			NC	RR2	RR2	NC	RR2	XCLK2	I(A)	
31	R-BL			NC	E2	NC	NC	NC	RTS2	I(B)	SCRB
_ 6	BL-R			NC	M2	NC	NC	NC	SCR2	SG	DCD
32	R-O		1	Ti	TI	Ti	Line+	T1	CTS1	NC T(P)	SG TxDB
7	O-R			Ri	RI	Ri	Line-	Ri	TXD1	T(B) T(A)	TxDA
33	R-G			NC	TR1	TR1	NC	T2	RXD1		
8	G-R	ľ	ĺ	NC	RR1	RR1	NC	R2	XCLK1	R(B)	RxDB
34	R-BR		]	NC.	E1	NC	NC	NC	RTS1	R(A)	RxDA
9_	BR-R	Ĺ		NC	Mi	NC	NC	NC	SCR1	S(A) S(B)	SCTA
35	R-S	2, 6, 10	2	12	T2	T2	NC	TR1	CTS2		SCTB
10	S-R			R2	R2	R2	NC	RR1	TXD2	C(A) C(B)	RTS
36	BK-BL	1	ł	NC	TR2	TR2	NC	TR2	RXD2		CTS SCRA
11	BL-BK			NC	RR2	RR2	NC	RR2	XCLK2	I(A)	SCRB
37	BK-O	1	ĺ	NC	E2	NC	NC	NC	RTS2	I(B)	DCD
12	O-BK		_	NC.	M2	NC	NC	NC	SCR2	SG NC	SG
38	BK-G		1	Ti	Ti	Ti	Line+	Ti	CTS1	T(B)	
13	G-BK			R1	Rt	Rt	Line-	Ri	TXD1	T(A)	TxDB TxDA
39	BK-BR			NC	TR1	TR1	NC	T2	RXD1	R(B)	RxDB
14	BR-BK	ĺ		NC	RR1	RR1	NC	R2	XCLK1	R(A)	RxDA
40	BK-S	1		NC	E1	NC	NC	NC ]	RTS1	S(A)	
15	S-BK			NC	Mt	NC	NC	NC	SCR1	S(B)	SCTA SCTB
41	Y-BL	3, 7, 11	2	T2	T2	<b>T</b> 2	NC	TR <sub>1</sub>	CTS2		
16	BL-Y			R2	R2	F2	NC	RR1	TXD2	C(A)	RTS
42	Y-O	1	1	NC	TR2	TR2	NC I	TR2	RXD2	C(B)	CTS
17	O-Y	ļ		NC	RR2	RR2	χ̈	RR2	XCLK2	I(A)	SCRA SCRB
43	Y-G		ĺ	NC	E2 .	NC	NC	NC .	RTS2	I(B) SG	DCD
18	G-Y			NC.	M2	NC	NC	NC	SCR2	NC NC	SG
44	Y-BR		i	T	T1	Ti	Line+	T)	CTS1	T(B)	TxDB
19	BR-Y	1	ļ	Rti∣	Rt	Rt	Line-	Ri	TXD1	T(A)	TxDA
45	Y-S	ŀ		NC	TR1	TR1	NC	T2	RXD1	R(B)	RxDB
20	S-Y			NC	RR1	RR1	NC	Pie ,	XCLK1	R(A)	RXDB
16	V-BL	Í	1	NC	E1	NC	NC	NC	RTS1	S(A)	SCTA
21	BL-V	_			Mt	NC	NC		SCR1	S(B)	SCTB
7	V-O	4, 8, 12	2	T2	12	<b>T</b> 2	NC		CTS2	C(A)	RTS
22	O-V	ļ		R2	R2		NC		TXD2	C(B)	CTS
8	V-G			NC	TR2	TR2	NC		RXD2	I(A)	SCRA
3	G-V	1	ļ	NC	RR2		NC		XCLK2	I(B)	SCRB
9	V-BR			NC	E2	NC	NC		RTS2	SG	DCD
4	BR-V				M2	NC	NC		SCR2	NC	SG
Ö	v-s									140	<u></u>
5	S-V	ground <sup>4</sup> ground									

<sup>1</sup> For part numbers 90-0154-05, 90-0154-01 and 90-0154-06. Universal cards 90-0154-05 and 90-0154-06 supply -48 V; 90-0154-01 does not supply -48 V.

<sup>2</sup> BK=Black, BL= Blue, BR=Brown, G=Green, O=Orange, R=Red, S=Slate, V=Violet, W=White, Y=Yellow.

<sup>&</sup>lt;sup>3</sup> NC = no connection.

<sup>&</sup>lt;sup>4</sup> For Universal card (90-0154-01) pins 25 and 50 are not used.

# 9.3 Connecting to the Universal Interface Card (48 V)

On the Universal Interface card (48 V), connector J1 carries the tip return (TR), ring return (RR), and E&M signals for module positions 1 through 6. Connector J2 carries the tip and ring signals for all module positions. Connector J3 carries the tip return (TR), ring return (RR), and E&M signals for module positions 7 through 12. See Figure 9-3. This card supplies a -48 voltage to modules that require it.

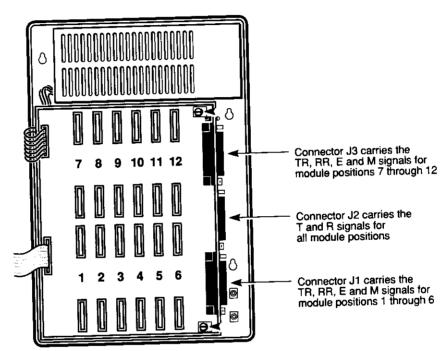


Figure 9-3: Module Position/Connector Assignment for the Universal Card (48 V)

Record the type of module installed in each position on the appropriate node configuration form in the Node Configuration Forms manual.

The 25-pair cable for connecting the connector on the Universal Interface card to the external voice and data devices requires the connector type that is listed in Table 9-3 and illustrated in Figure 9-2 for the wall-mounted units. A 25-pair cable is also available from Newbridge and is listed in the Ordering Information manual. The type of connector used with the rack-mount drawer is described in section 9.5, "Connecting to the Rack-mounted Drawer".

Table 9-3: 25-pair Cable Connector Types

ſ	Canada	U.S
Universal	CA2GA	RJ2GX

The two variants of the OCU module, OCU-I (90-0693-01) and OCU-II (90-0693-02), do not have the same pin/signal assignment; therefore, they are not interchangeable on the Universal Interface card (48 V).

The RS-232 Direct Connect Modules (DCM) connects to external DCE or DTE equipment through one of the three 50-pin female connectors. You must connect the signals to an intermediate distribution panel (punch-down block) and then to the RS-232 distribution panel in order to convey the signals from the 3624 system to industry standard DB-25 interfaces. The RS-232 distribution panel is available from Newbridge.

#### To connect to the external circuits

- 1. Attach one end of a 25-pair cable to the male 50-pin connector on the Universal (48 V) card so that the cable exits from the bottom of the 3624 without being bent (see Figure 9-2).
- 2. Attach the other end of the 25-pair cable to the appropriate device such as a punch-down block or data device.

The pin/signal assignments apply to Universal Interface card (48 V) (90-0154-02) for the wall-mounted units and the Universal Interface card (48 V) (90-0154-03) for the rack-mounted drawer.

Table 9-4 shows the pin/signal assignment of connectors J1 and J3 for the module positions and module types installed on the Universal card (48 V).

Table 9-5 shows the pin/signal assignment of connector J2. If only LGS, LGE and DNIC modules are installed on the Universal card (48 V), then connector J2 is used to convey the signals from the 3624; connector J1 and J3 are not used.



NOTE: The standard pair colours are read <first colour> on <second colour>, the second colour being the prominent one. For example, pin #26 is W-BL and is read as 'white on blue'.

Table 9-4: Pin/Signal Assignment of Universal Card<sup>1</sup> (48 V) Connectors J1 and J3

			ŗ				Modu	le Type	•		
Pin	Pair Colour <sup>2</sup>	Module Position	Circuit Number	LGS LGE MRD	E&M	4W-TO OCU-II (02)	DNIC	OCU-I (01)	RS-232 DCM	X.21 DCM	V.35 DCM
26 1 27	W-BL BL-W W-O		1	NC <sup>3</sup> NC NC NC	TR1 RR1 E1 M1	TR1 RR1 NC NC	NC NC NC	T2 R2 NC NC	RXD1 XCLK1 RTS1 SCR1	R(B) R(A) S(A) S(B)	RXDB RXDA SCTA SCTB
2 28 3 29	O-W W-G G-W W-BR	1,7	2	NC NC NC NC	TR2 RR2 E2 M2	TR2 RR2 NC NC	NC NC NC	TR2 RR2 NC NC	RXD2 XCLK2 RTS2 SCR2	I(A) I(B) SG NC	SCRA SCRB DCD SG
30 5 31	BR-W W-S S-W R-BL		1	NC NC NC	TR1 RR1 E1 M1	TR1 RR1 NC NC	NC NC NC NC	T2 R2 NC NC	RXD1 XCLK1 RTS1 SCR1	R(B) R(A) S(A) S(B)	RxDB RxDA SCTA SCTB
32 7 33	BL-R R-O O-R R-G	2,8	2	NC NC NC	TR2 RR2 E2 M2	TR2 RR2 NC NC	NC NC NC	TR2 RR2 NC NC	RXD2 XCLK2 RTS2 SCR2	I(A) I(B) SG NC	SCRA SCRB DCD SG
34 9 35	G-R R-BR BR-R R-S		1	NC NC NC	TR1 RR1 E1 M1	TR1 RR1 NC NC	NC NC NC	T2 R2 NC NC	RXD1 XCLK1 RTS1 SCR1	R(B) R(A) S(A) S(B)	RXDB RXDA SCTA SCTB
36 11 37	S-R BK-BL BL-BK BK-O	3, 9	2	NC NC NC	TR2 RR2 E2 M2	TR2 RR2 NC NC	NC NC NC NC	TR2 FR2 NC NC	RXD2 XCLK2 RTS2 SCR2	I(A) I(B) SG NC	SCRA SCRB DCD SG
38 13 39	O-BK BK-G G-BK BK-BR BR-BK		1	NC NC NC	TR1 RR1 E1 M1	TR1 RR1 NC NC	NC NC NC	T2 R2 NC NC	RXD1 XCLK1 RTS1 SCR1	R(B) R(A) S(A) S(B)	RXDB RXDA SCTA SCTB
14 40 15 41	BK-S S-BK Y-BL	4, 10	2	NC NC NC	TR2 RR2 E2 M2	TR2 RR2 NC NC	NC NC NC	TR2 RR2 NC NC	RXD2 XCLK2 RTS2 SCR2	I(A) I(B) SG NC	SCRA SCRB DCD SG
16 42 17 43	9L-Y Y-O O-Y Y-G		1	NC NC NC	TR1 RR1 E1 M1	TR1 RR1 NC NC	NC NC NC	T2 R2 NC NC	RXD1 XCLK1 RTS1 SCR1	R(B) R(A) S(A) S(B)	RxDB RxDA SCTA SCTB
18 44 19 45	G-Y Y-BR BR-Y Y-S	5, 11	2	NC NC NC	TR2 RR2 E2 M2	TR2 RR2 NC NC	NC NC NC	TR2 RR2 NC NC	RXD2 XCLK2 RTS2 SCR2	I(A) I(B) SG NC	SCRA SCRB DCD SG
20 46 21 47	S-Y V-BL BL-V V-O O-V		1	NC NC NC	TR1 RR1 E1 M1	TR1 RR1 NC NC	NC NC NC	T2 R2 NC NC	RXD1 XCLK1 RTS1 SCR1	R(B) R(A) S(A) S(B)	RxDB RxDA SCTA SCTB
48 23 49 24	V-G G-V V-BR	6, 12	2	NC NC NC	TR2 RR2 E2 M2	TR2 RR2 NC NC	NC NC NC	TR2 RR2 NC NC	RXD2 XCLK2 RTS2 SCR2	I(A) I(B) SG NC	SCRA SCRB DCD SG
50 25	V-S				•		30 mA m 30 mA m				

3 NC = no connections

<sup>25</sup> S-V Tor Universal Interface card (48 V ) Part Numbers 90-0154-02 and 90-0154-03

BK=Black, BL= Blue, BR=Brown, G=Green, O=Orange, R=Red, S=Slate, V=Violet, W=White, Y=Yellow

Table 9-5: Pin/Signal Assignment of Universal Card<sup>1</sup> (48 V) Connector J2

				Module Type							
	Pair	Module	Circuit	LGS	T -	4W-TC		7,	RS-232	X.21	V.35
Pin	Colour <sup>2</sup>	Position	Number	LGE MRD	E&M	OCU-11 (02)		OCU- (01)		DOM	DOM
26	W-BL	<u> </u>	1	T1	Tt		Line+	Ti	CTS1	T(B)	TxDB
1	BL-W			R1	Pil	Rt	Line-	Ri	TXD1	T(A)	TxDA
27	W-O	1	2	T2	12	T2	NC3	TR1	CTS2	C(A)	RTS
2_	O-W			R2	R2	P2	NC	RR1	TXD2	C(B)	CTS
28	W-G		1	T1	Τ'n	Ti	Line+	71	CTS1	T(B)	TxDB
3	G-W	_		R1	R1	, Pri	Line-	Rı	TXD1	T(A)	TxDA
29	W-BR	2	2	12	T2	T2	NC	TR1	CTS2	C(A)	RTS
30	BR-W W-S			P2	F2	P2	NC	RR1	TXD2	C(B)	CTS
30 5	S-W		1	ΤΊ	T1	Ti	Line+	T1	CTS1	T(B)	TxDB
31	R-BL	3	_	Rt	RI	R1	Line-	Rt	TXD1	T(A)	TxDA
6	BL-R	3	2	T2	72	T2	NC	TR1	CTS2	C(A)	RTS
32	R-O		1	R2	P2	P2	NC	RR1	TXD2	C(B)	CTS
7	O-R	i	1	Ti Ri	Ti Pi	Τί	Line+	Ti	CTS1	T(B)	TxDB
33	R-G	4	2	72	T2	Rt T2	Line- NC	Rt	TXD1	T(A)	TxDA
8	G-R		~	FŽ	P2	P2	NC NC	TR1 RR1	CTS2	C(A)	RTS
34	R-BR	_	1	T1	Ti	Ti	Line+	T1	TXD2 CTS1	C(B)	CTS
9	BR-R			Rt	Ri	Ri	Line-	Ri	TXD1	T(B) T(A)	TxDB
35	R-S	5	2	T2	T2	T2	NC	TR1	CTS2	C(A)	TxDA
10	S-R			R2	P2	R2	NC	RR1	TXD2	C(B)	CTS
36	BK-BL		1	T1	Ti	Ti	Line+	T1	CTS1	T(B)	TxDB
11	BL-BK		}	R1	Rí	R1	Line-	Ri	TXD1	T(A)	TxDA
37 12	BK-O	6	2	T2	T2	T2	NC	TR1	CT\$2	C(A)	RTS
38	O-BK BK-G			FR2	FI2	R2	NC_	RR1	TXD2	C(B)	CTS
13	G-BK		1	Ti	Ti	Τĭ	Line+	T1	CTS1	T(B)	TxDB
39	BK-BR	7	2	Rti T2	Pi Pi	Rt	Line	Ptt	TXD1	T(A)	TxDA
14	BR-BK	,	-	F2	112 PR2	T2 P2	<b>1</b> 20	TR1	CTS2	C(A)	RTS
40	BK-S		1	TI	Ti	Ti	Line+	RR1	TXD2	C(B)	CTS
15	S-BK	1	'	Ri	Ri	Ri	Line-	T1 Pd	CTS1 TXD1	T(B)	TxDB
41	Y-BL	8	2	T2	T2	T2	NC	TR1	CTS2	T(A) C(A)	TxDA RTS
16	BL-Y			P2	F2	P2	NC	RR1	TXD2	C(A) C(B)	CTS
42	Y-0		1	71	Ti	Ti	Line+	Ti	CTS1	T(B)	TxDB
17	O-Y	_		Rt i	Ri	Ri	Line-	Ri	TXD1	T(A)	TXDA
43	Y-G	9	2	T2	<b>T</b> 2	<b>T</b> 2	NC	TR1	CTS2	C(A)	RTS
18	G-Y			R2	FI2	R2	NC	RR1	TXD2	C(B)	CTS
19	Y-BR BR-Y		1	T1	Ti	Ti	Line+	Ti	CTS1	T(B)	TxDB
45	Y-S	10	2	Ri	Rt	Rt .	Line-	<u>R1</u>	TXD1	T(A)	TxDA
20	S-Y	.0	~	12 R2	T2 P2	72 R2	NC	TR1	CTS2	C(A)	RTS
46	V-BL		1	T1 +	Ti	Ti	NC	RR1	TXD2	C(B)	CTS
21	BL-V		'	Ri	Pri	Ri I	Line+ Line-	Tí Ri	CTS1	T(B)	TxDB
47	V-O	11	2	T2	T2	72	NC	TR1	TXD1	T(A)	TxDA
22	O-V			FI2	F2	PŽ	NC /	RR1	CTS2 TXD2	C(A) C(B)	RTS CTS
48	V-G		1	T1	ויד	Ti	Line+	T1	CTS1	T(B)	TxDB
23	G-V			Rt	Ri	Ri	Line-	Ri	TXD1	T(A)	TxDA
49	V-BR	12	2	T2	T2	72	NC NC	TR1	CTS2	C(A)	RTS
24	BR-V			R2	F2	R2	NC	RR1		C(B)	CTS
50 ~	V-S					5 V, 30 m					
25	5 S-V -15 V, 30 mA max										

<sup>1</sup> For Universal Interface card (48 V) Part Numbers 90-0154-02 and 90-0154-03
2 BK=Black, BL= Blue, BR=Brown, G=Green, O=Orange, R=Red, S=Slate, V=Violet, W=White, Y=Yellow

<sup>&</sup>lt;sup>3</sup>NC=no connection

## 9.4 Connecting to the LGS Card (48 V)

External voice circuits are connected to the 3624 MainStreet via the connectors on the LGS Interface card (48 V).

The LGS card (48 V) has 12 positions for module interfaces. Power and ringing voltage are provided to the LGS card through direct connection to the Control card. This card supplies a -48 voltage to module interfaces that require a -48 V on-hook battery voltage.

One 50-pin connector, labelled J1, provides the connections for external voice circuits. It carries the signals for all module positions. See Figure 9-4.

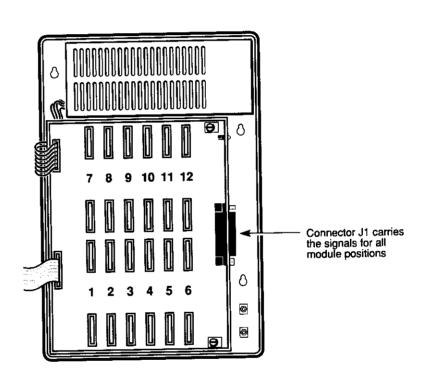


Figure 9-4: Module Position/Connector Assignment LGS Cards

The modules types that can be installed in any position on the LGS card  $(48\ V)$  are:

- LGS
- ☐ LGE
- ☐ MRD

Record the type of module installed in each position on the appropriate node configuration form in the Node Configuration Forms manual.

The 25-pair cable for connecting the connector on the LGS Interface card to the external voice circuits requires the connector type that is listed in Table 9-6. A 25-pair cable is also available from Newbridge and is listed in the Ordering Information manual. The type of connector used with the rackmount drawer is described in section 9.5, "Connecting to the Rack-mounted Drawer".

Table 9-6: LGS Card Connector Types

	Canada	v.s
LGS	CA21A	RJ21X

#### To connect to the external circuits

1. Attach one end of a 25-pair cable to the male 50-pin connector on the LGS card (48 V) so that the cable is oriented in the opposite direction than that shown in Figure 9-2.

If you have the earlier version, LGS card (90-0155-01), the cable is oriented in the same direction as shown in Figure 9-2.

2. Attach the other end of the 25-pair cable to the appropriate device such as a punch-down block.

Table 9-7 shows the pin/signal assignment of connectors J1, J2 and J3 for the module positions and module types installed on the LGS card (48 V) (90-0155-02). The pin/signal assignment also applies to the earlier LGS card (90-0155-01) and to the LGS card (48 V) (90-0155-03) of the rack-mounted drawer.



NOTE: The standard pair colours are read <first colour> on <second colour>, the second colour being the prominent one. For example, pin #26 is W-BL and is read as 'white on blue'.

Table 9-7: Pin/Signal Assignment of LGS Card1 (48 V) Connector J1

				Module Type
\	Pair	Module Position	Circuit	LGS, LGE MRD
Pin	Colour <sup>2</sup>	1 0311011	1	T1
26	W-BL BL-W		. ' 1	Ří
1	W-O	1	2	<b>T</b> 2
27 2	0-W		. <del>-</del> 1	R2
28	W-G		1	T1
3	G-W			Rt
29	W-BR	2	2	T2
4	BR-W			
30	W-S		1	Ţ1 ≈
5	S-W	3		R1
31	R-BL	J	2	T2 FR2
6	BL-R		<del>  </del>	T1
32	R-O		1	l R1
7	O-R	4	2	T2
33	R-G		_	P2
8	G-R		1 1	T1
34	R-BR BR-R			Ì Ri
9 35	R-S	5	2	T2
10	S-R			R2
36	BK-BL		1	11
11	BL-BK	_		Ri
37	BK-O	6	2	T2
12	O-BK		<u> </u>	P2
38	BK-G	İ	1	T1
13	G-BK	7	_	Pil To
39	BK-BR	′	2	T2 FR2
14	BR-BK	<del> </del>	+	Ti
40	BK-S		1	R1
15	S-BK	8	2	T2
41	Y-BL BL-Y	_	_	Fi2
16 42	Y-0	+	1	T1
17	0-Y		,	Ri
43	Y-G	9	2	T2
18	G-Y			
44	Y-BR		1	T1
19	BR-Y	40	1	Pi Pi
45	Y-S	10	2	T2
20	S-Y			
46	V-BL		1	Ti
21	BL-V	11	_	R1 T2
47	V-O	"	2	F2
22	O-V_		<del></del>	T1
48	V-G		1	Ri
23	G-V V-BR	12	2	T2
49 24	BR-V			FR2
50	V-S		Ori	ound
25 25	\$-V	Ì	ar	ound
رے			0.0455.00.000	190-0155-03 supply

<sup>1</sup>For LGS cards, Part Numbers 90-0155-02 and 90-0155-03 supply 48 V; 90-0155-01 does not supply 48 V.

<sup>2</sup>BK=Black, BL= Blue, BR=Brown, G=Green, O=Orange, R=Red, S=Slate, V=Violet, W=White, Y=Yellow

#### 9.5 Connecting to the Rack-mounted Drawer

External voice and data circuits are connected to a 3624 rack-mounted drawer in the same way as they are connected to their wall-mounted counterparts. The differences are the location of the connector and the type of cable used.

All external circuit connections are made at the rear of the 3624 rack-mount drawer. The arrangement, connector types, and pin/signal assignments are otherwise identical to the wall-mount units.

Like wall-mounted 3624s, all external circuit connections must be made before powering up the 3624 rack-mounted drawers.

Use only 25-pair cables with straight headshells (AMP 552003-1, or equivalent). Do not use 25-pair cables with right-angled backshells. The type of cable chosen must be long enough and flexible enough to be dressed in a service loop. This allows freedom of movement through the full 13" (33 cm) width of the drawer when the drawer is pulled out.



NOTE: This procedure describes the connections for the Universal Interface card. The procedure is the same for the LGS Interface card with the exception that only one cable is used.

#### To connect to the external circuits

To perform this procedure you require 25-pair cables with straight backshells, needle nose pliers and tie wraps (approximately 6 per drawer).

- 1. Attach one end of each 25-pair cable to the 50-pin male connector on the Interface card as shown in Figure 9-5.
- 2. Gather all external circuit cables for a given drawer.

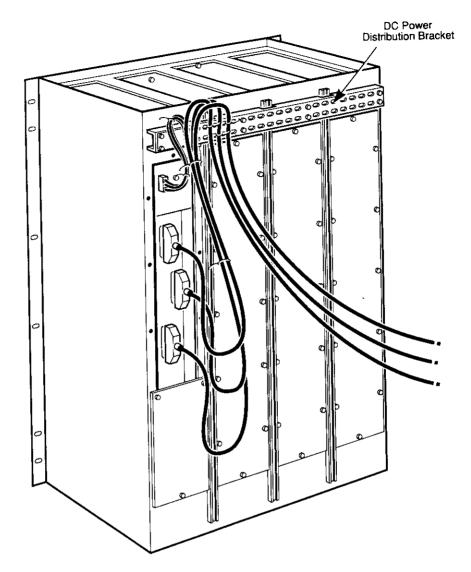


Figure 9-5: Connection to the Interface Card on the Rack-mounted Drawer

- Create one or more loops long enough to allow the drawer to be fully opened.
- 4. Tie wrap the tops of the loops to the rack shelf cable support bracket or DC power distribution bracket if it is attached. See Figure 9-5.
- Dress the cables into a bundle by tie wrapping them together between the upper and lower loops (see Figure 9-5).
- 6. Attach the other end of each 25-pair cable to the appropriate device.

	•		

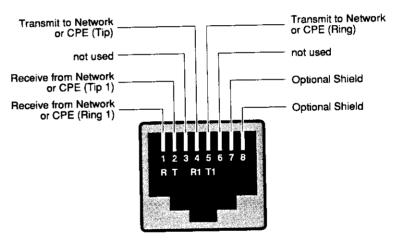
# 10. Connecting to the Network

This chapter describes the connection to the network, including:

- connecting to the T1 line
- the pin/signal assignment of T1 connector

#### 10.1 The Network Connector

The T1 line is connected to the 3624 MainStreet through a RJ48C connector on the Control card. The connector is labelled J4. Figure 10-1 shows the pin/signal assignment of connector J4.



\*CPE = Customer Premise Equipment

Figure 10-1: Pin/Signal Assignment of Connector J4

Use 8-wire telephone style flat cable with RJ45C connectors on each end. Cables are available from your Newbridge representative. The part numbers are listed in the Ordering Information manual.

## To connect to the network

- 1. Connect an RJ45C cable to the T1 line.
- 2. Connect the other end of the RJ45C cable to connector J4 on the Control card.

See Figure 10-2 for the connection on the Control card on the wall-mount unit.

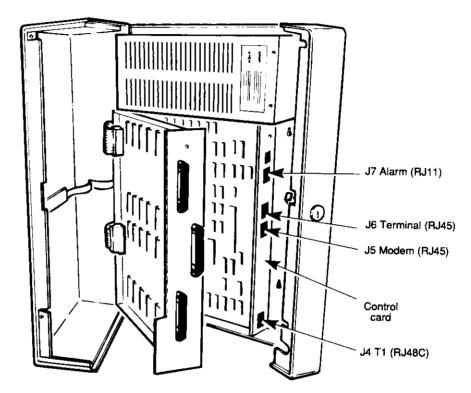


Figure 10-2: J4 Connector on the Control Card - Wall-mount Unit

Connector J4 is found on the back of the rack shelf assembly. See Figure 10-3 for the location of J4 on the Control card on the rack-mount drawer.

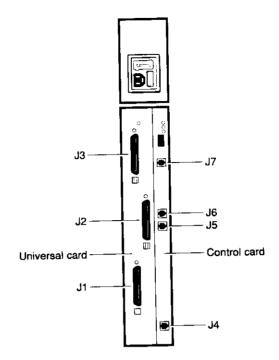


Figure 10-3: J4 Connector on the Control Card - Rack-mount Drawer

# 11. Connecting the Node Management Equipment

This chapter describes the node management equipment, including:

- pin/signal assignment of the serial port connectors
  - equipment requirements and settings

#### 11.1 Serial Port Connectors

Node management refers to the activities required to configure, operate, and maintain a 3624 MainStreet. These activities are carried out through the user interface called the Node Management Terminal Interface (NMTI). To gain access to the NMTI, a node management terminal must be connected to either RJ45 connectors, labelled J5 and J6 on the Control card. (The node management interface circuitry is contained on the Control card.)

Figure 11-1 shows the location of the connectors on the wall-mounted unit.

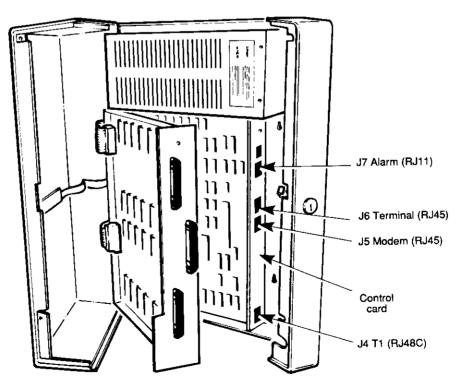


Figure 11-1: Location of Connectors J5 and J6 - Wall-mount Unit

Figure 11-2 show the location of connectors J5 and J6 on back of the shelf unit for the rack-mounted drawers.

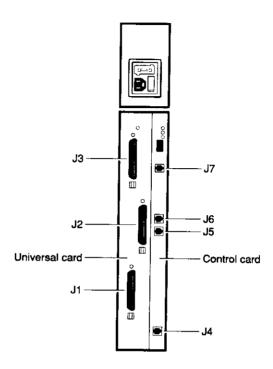


Figure 11-2: Location of Connectors J5 and J6 - Rack-mount Drawer

## Connector J5 (Modem)

Connector J5 is configured as Data Terminal Equipment (DTE) according to the RS-232 specification. The NMTI refers to this connector as Serial Port 2. You can connect your terminal indirectly to the 3624 via this connector through a modem or a Data Termination Unit (DTU).

Figure 11-3 shows the pin/signal assignment of connector J5. The arrows indicate signal direction.

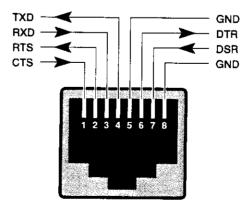


Figure 11-3: Pin/Signal Assignment of Connector J5

# Connector J6 (Terminal)

Connector J6 is configured as Data Communications Equipment (DCE) according to the RS-232 specification. The NMTI refers to this connector as Serial Port 1. You can connect your terminal directly to the 3624 via this connector.

Figure 11-4 shows the pin/signal assignment of connector J6. The arrows indicate signal direction.

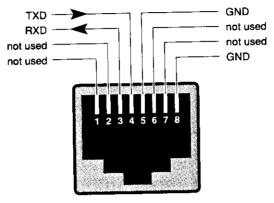


Figure 11-4: Pin/Signal Assignment of Connector J6

### 11.2 Connecting to the Node Management Equipment

Either connector J5 or J6 can be used to support the node or network management terminal, provided the settings are changed to accommodate the device used. The appropriate cables must be available to provide the correct interface between the device and the serial port connectors.

The node or network management equipment can be connected:

- ☐ directly to connector J6
- indirectly via a modem, null-modem or 2600-series MainStreet Data Termination Unit (DTU) to connector J5

For node or network management of the 3624, the following equipment is required:

- one VT100 or compatible terminal, or
- a personal computer with VT100 terminal emulation software, or
- ☐ a computer running 4600-series network management software, and
- one cable with RJ45 connectors.

If your terminal, personal computer or modem does not have an RJ45 connector, you must use an appropriate adapter. Two user-configurable RJ45 to DB25 adapters are provided in the 3624 MainStreet Installation Kit. Other adapters and cables are listed in the Ordering Information manual and can be obtained from your Newbridge sales representative.

The serial port of the terminal or computer must be set for:

9600 b/s (if connected to J6) or

1200 b/s (if connected to J5)

8 data bits

1 stop bit

no parity

no local echo
full duplex



NOTE: If you plan to control the 3624 MainStreet from a 4600-series network manager, consult the 4600-series network manager documentation for instructions on installing the network management equipment.

#### To connect via the terminal connector

- 1. Attach one end of the RJ45 cable to connector J6 if you are connecting the node management terminal directly to the 3624.
- 2. Attach the other end of the RJ45 cable (from connector J6) to the VT100 terminal or personal computer.
- 3. Plug the node or network management terminal into a live AC outlet and turn the terminal on.
- 4. Turn the 3624 on.

Refer to Chapter 12, Powering Up the System, in this manual for more details.

#### To connect via the modem connector

- 1. Attach one end of the RJ45 cable to connector J5 if you are connecting the node management terminal indirectly to the 3624.
- 2. Attach the other end of the RJ45 cable (from connector J5) to the modem or the Data Termination Unit.
- 3. Plug the node or network management terminal into a live AC outlet and turn the terminal on.
- 4. Turn the 3624 on.

Refer to Chapter 12, Powering Up the System, in this manual for more details.

# 12. Powering Up the System

This chapter describes powering up the system. It includes:

□ powering up an AC wall-mount and rack-mount system

□ powering up a DC wall-mount and rack-mount system

□ the start-up diagnostics

## 12.1 Powering Up an AC Wall-mount System

Once it is powered up, the 3624 goes through a number of diagnostics, or self-tests. The results are indicated on the LEDs (light emitting diodes) on the Control card, the Interface card and the chassis cover as the system cycles through its diagnostic tests. This cycle verifies that the procedure was successful.

Refer to section 12.5, "Start-up Diagnostics" for a description of the diagnostic tests.

# To power up an AC wall-mount system

Open the chassis side door.

Ensure that the power switch, located on the under surface of the power supply, is in the Off position. See Figure 12-1 for the location of the power switch.

- If it is not already done, connect the power cord to the power supply plug, located on the under surface of the power supply (see Figure 12-1).
- 3. Secure the power cord to the cable tie mount with a cable tie. (See Figure 12-1).
- Plug the other end of the power cord into a dedicated power source that is not controlled by a switch.



WARNING: Do not power up the system until all external circuit connections have been made. See Chapter 9, Connecting to External Voice and Data Circuits.

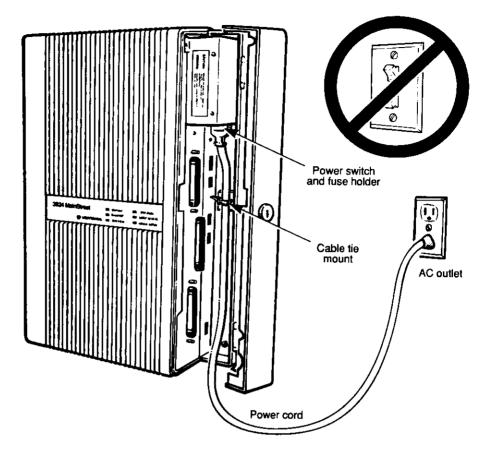


Figure 12-1: AC Power Supply and Cord on Wall-mount AC System

- 5. Turn on the 3624 MainStreet's power switch.
- 6. Close the chassis cover.
- 7. Fasten the two screws that hold the cover in place.
- 8. Close and lock the chassis side door.

#### 12.2 Powering Up an AC Rack-mount System

Once it is powered up, the 3624 goes through a number of diagnostics, or self-tests. The results are indicated on the LEDs (light emitting diodes) on the Control card, the Interface card and the front and rear faceplates as the system cycles through its diagnostic tests. This cycle verifies that the procedure was successful.

Refer to section 12.5, "Start-up Diagnostics" for a description of the diagnostic tests.

# To power up an AC rack-mount system

1. Ensure that the power switch, located on the rear faceplate, is in the Off position. See Figure 12-2 for the power switch location.

Off is indicated by an "O" and On is indicated by an "1" inscribed on the power switch itself.

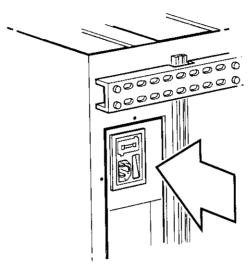


Figure 12-2: AC Power Switch and Plug

- 2. Connect one end of the power cord to the power supply outlet. See Figure 12-2.
- 3. Secure the power cord to the cable support bracket with a cable tie, creating a loop long enough to allow the drawer to be fully opened and closed.
- Plug the other end of the power cord into a dedicated power source that is not controlled by a switch.



WARNING: Do not power up the system until all external circuit connections are made. See Chapter 9, Connecting to External Voice and Data Circuits.

5. Turn the rear faceplate power switch to the On position.

#### 12.3 Powering up a DC Wall-mount System

Once it is powered up, the 3624 goes through a number of diagnostics, or self-tests. The results are indicated on the LEDs (light emitting diodes) on the Control card, the Interface card and the chassis cover as the system cycles through its diagnostic tests. This cycle verifies that the procedure was successful.

Refer to section 12.5, "Start-up Diagnostics" for a description of the diagnostic tests.

# To power up an DC wall-mount system

- 1. Open the chassis side door.
- 2. Ensure that the DC circuit breaker, located on the under surface of the power section, is in the Off position.
- 3. Remove the terminal block protection from the power supply unit (see Figure 12-3 for the location of the terminal block).

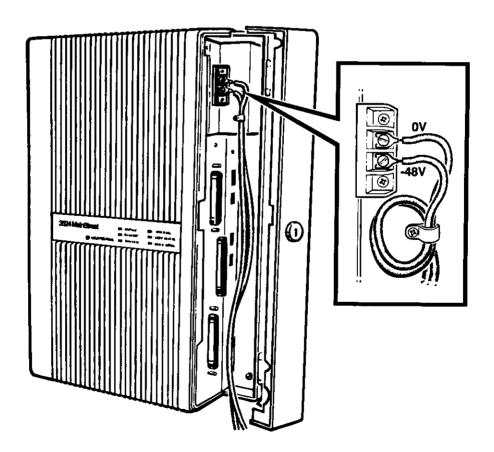


Figure 12-3: DC Power Supply Unit

4. Loosen the screw on the cable clamp.

Feed the DC power wires through the clamp, looping them if possible. See Figure 12-3.

Tighten the screw on the clamp so the wires are held securely.

6. Connect the DC power wires to the terminal block (see Figure 12-3) to a torque value of 8.5 lbf • in. ±10 % (1.0 N • m ±10 %).

Ensure that the 0 V and 48 V wires are connected to the correct terminals as shown in Figure 12-3.

- 7. Re-attach the terminal block protection.
- Run the DC power wires along the cable channel and secure the wires to the cable tie mount with a cable tie.
- Run the DC power cable to a DC power source and connect the wires (note the polarity).



WARNING: Do not power up the system until all external circuit connections have been made. See Chapter 9, Connecting to External Voice and Data Circuits.

- 10. Turn on the circuit breaker.
- 11. Close the chassis cover.
- 12. Fasten the two screws that hold the cover in place.
- 13. Close and lock the chassis side door.

## 12.4 Powering Up a DC Rack-mount System

Once it is powered up, the 3624 goes through a number of diagnostics, or self-tests. The results are indicated on the LEDs (light emitting diodes) on the Control card, the Interface card and the front and rear faceplates as the system cycles through its diagnostic tests. This cycle verifies that the procedure was successful.

Refer to section 12.5, "Start-up Diagnostics" for a description of the diagnostic tests.

To complete DC power connections, you must:

attach the DC power distribution assembly to the shelf
 connect the DC drawers to the DC power distribution assembly
 connect the DC power distribution assembly to a DC power source

To perform this procedure, you require the following tools:

- ☐ #2 Philips screwdriver
- ☐ straight screwdriver
- □ wire stripper/cutter
- crimping tool
- □ Rack DC Connector Kit
- ☐ DC input power cabling (18 gauge AWG minimum; length as required)

The power cabling must be in accordance with the National Electrical Code (ANSI/NFPA No. 70-1987), Chapter 3, articles 345, 346, 347, 348, 349, and 350.

# To power up an DC rack-mount system

- 1. Loosen the captive screws (top and bottom) on the drawer faceplate.
- 2. Grasp the drawer by the bottom edge of the faceplate.
- 3. Pull out the drawer until the slides lock into position.
- 4. Ensure that the DC drawer circuit breaker is in the Off position.

The circuit breaker is within the drawer on the upper right corner of the power supply (see Figure 12-4).

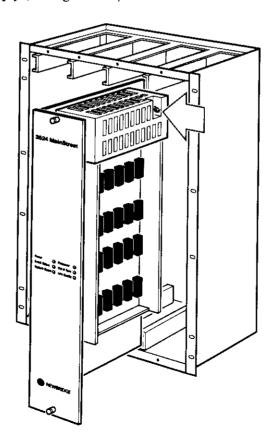


Figure 12-4: DC Circuit Breaker

Remove the existing cable support bracket from the rear of the shelf (see Figure 12-5). Keep the screws.

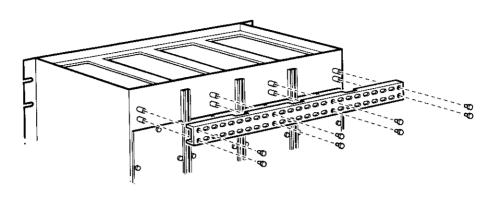


Figure 12-5: Removing Existing Cable Support Bracket

Align the DC power distribution circuit board with the tapped standoffs on the shelf (see Figure 12-6).

Secure the circuit board to the shelf with the male/female hex spacers provided.

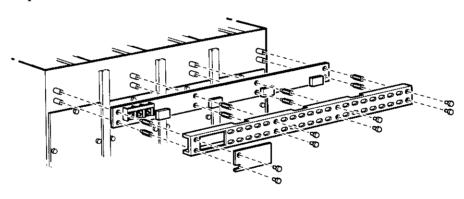


Figure 12-6: Attaching DC Power Distribution Assembly

 Align the DC power distribution cable support bracket with the male/female hex spacers.

Secure the bracket with the screws removed in Step 2 (see Figure 12-6).

 Connect a DC power interconnect cable between the power connector on the rear faceplate of the drawer and the power connector on the DC power distribution circuit board (see Figure 12-7).

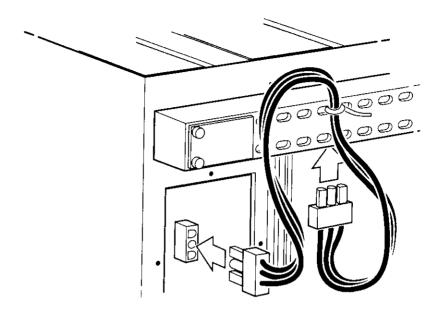


Figure 12-7: Attaching DC Power Interconnect Cables

- **9.** Dress the DC power interconnect cable in a service loop (see Figure 12-7).
- 10. Strip 1/4 inch (0.6 cm) of insulation from the end of each of the three conductors of the DC input power cable.

Crimp a spade lug onto each of the three conductors (see Figure 12-8).

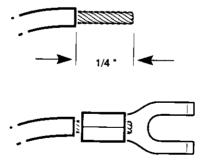


Figure 12-8: Attaching Spade Lugs to DC Input Power Cabling

**11.** Loosen the two screws on the DC terminal block access cover (see Figure 12-9).

Swing the cover up to expose the DC power terminal block. Tighten the top screw to hold the cover open.

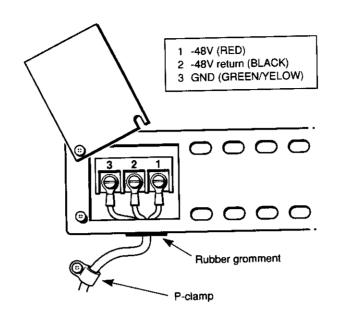


Figure 12-9: DC Power Terminal Block Connections

- 12. Install the rubber grommet in the opening on the under surface of the cable support bracket (see Figure 12-9).
- 13. Feed the three conductors of the DC input power cable through the grommet opening (see Figure 12-9).
  - Connect the conductors to the terminal block according to the pin assignment shown in Figure 12-9.
- 14. Close and secure the DC terminal block access cover.
- 15. Dress the DC input power cable through the P-clamp attached to the shelf beneath the DC terminal block access cover (see Figure 12-9).
- **16.** Connect the other end of the DC input power cable to an approved DC power supply.



WARNING: Do not power up the system until all external circuit connections are made. See Chapter 9, Connecting to External Voice and Data Circuits.

- 17. Turn the circuit breaker to the On position.
- 18. Depress the drawer member tabs (top and bottom) while pushing the drawer all the way into the shelf (see Figure 12-10).

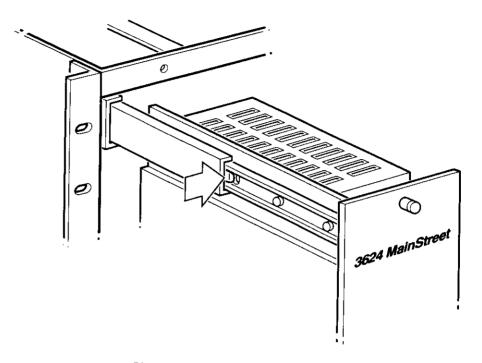


Figure 12-10: Drawer Member Tabs

19. Secure the drawer to the shelf with the captive screws on the drawer faceplate.

#### 12.5 Start-up Diagnostics

Once it is powered up, the 3624 goes through a number of diagnostics, or self-tests. The results are indicated on the LEDs (light emitting diodes) on the Control card, the Interface card and the chassis cover (for the wall-mount unit) or the front faceplate (for the rack-mount drawer) as the system cycles through its diagnostic tests. This cycle verifies that the procedure was successful.

See Figure 12-11 for the location of the LEDs on the wall-mount unit. See Figure 12-12 for the location of the LEDs on the rack-mount drawer .

The start-up diagnostic tests should last less than one minute. If the LEDs do not light as described, or if the diagnostics last more than one minute, consult Chapter 1, Visual Indicators, in the Maintenance manual.

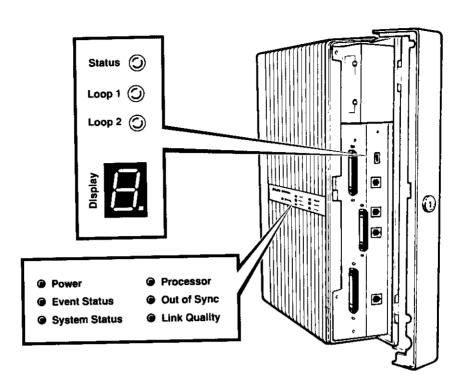


Figure 12-11: Location of LEDs on the Wall-mount Unit

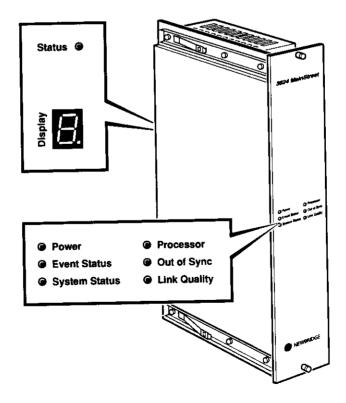


Figure 12-12: Location of LEDs on the Rack-mount Drawer

When the 3624 is powered up, the system LEDs light up as follows.

# On the cover or faceplate

- The Power LED lights continuously.
- This indicates that the power is on.
- ☐ The other five LEDs light one after another, first in a clockwise, then a counterclockwise pattern.

This indicates that the diagnostic tests are being performed.

☐ The Processor LED flashes in a 0.1 second on, 0.9 second off pattern.

This continues until the system software has initialized itself and the database.

☐ Then the Processor LED flashes in a 'heart beat' pattern (0.2 seconds on, 0.1 seconds off, 0.2 seconds on, 0.5 seconds off).

This occurs if there are unacknowledged alarms in the alarm queue.

Or the Processor LED flashes in a 0.5 second on, 0.5 second off pattern.

This occurs if all of the alarms in the alarm queue have been acknowledged.

# On the Control card

The Power Indicator, the dot, on the seven-segment display lights.

This indicates that the power is on.

☐ The Seven-segment Display flashes one segment after another first in a clockwise, then a counter-clockwise pattern.

If a number from 1 to 6 appears (for approximately one-half second), it indicates that the diagnostic tests have discovered a problem.

See Table 12-1 for an explanation of the error codes and the action to be taken. Wait until the diagnostic tests are completed before attempting to rectify the problem.

Table 12-1: Diagnostic Error Codes

Error Code	Test	Description	Problem	Action
1	PROM Test	A checksum is performed over the entire program space.	PROM check sum error	Check that the PROMs are properly installed on the Control card.
2	RAM Test	This test writes and reads a byte, word, and long word from a segment in RAM, performs a walking bit test on a long word in RAM, writes and reads a fixed long word over the entire RAM and tests the address lines.	RAM check failure	Turn the power off, wait 30 seconds, then restart the system, If the problem persists, contact your Newbridge service representative.
3	Processor Viability Test	This test causes a bus interrupt and then verifies that the interrupt is a bus interrupt.	Processor viability failure	Contact your Newbridge service representative.
4	DX (Digital Cross- connect) Test	This test writes and reads to and from all DX chips to verify data integrity.	DX test failure	Contact your Newbridge service representative.
5	Timer Test	This test verifies the frequency of the timer.	Timer check failure	Contact your Newbridge service representative.
6	Control card HDLC (High-level Data Link Control) Test	This test checks the function of the HDLC chips on the Control card by making a loopback through the DX and then sending a packet through.		Contact your Newbridge service representative.

Next, the seven-segment display flashes a 'P' once, then a 'd'. This may take up to 30 seconds.

After the 'd' stops flashing, a number flashes (as in normal operation).

- The Status LED lights continuously.
  - The Status LED lights continuously.

The 'P' indicates that the powerup diagnostics are complete. The 'd' continues until the system software and the database are initialized.

The flashing number indicates that the power up procedure has ended and that the 3624 is ready for configuration. The number indicates the number of alarms in the Major alarm queue.

It indicates that the Control card is functioning.

It indicates that the Interface card is functioning.

card

On the Interface

#### 12.6 What's Next?

You have now finished the hardware installation.

Configuration and most maintenance activities for the 3624 are carried out through the user interface called the Node Management Terminal Interface (NMTI). Now you are ready to log onto the NMTI, as described in Chapter A1, The Node Management Terminal Interface, in the Configuration manual.

If an error code (as outlined in Table 12-1) appeared during the power up procedure, proceed through Chapter A1, The Node Management Terminal Interface, in the Configuration manual to familiarize yourself with the NMTI. Then refer to Chapter 2, Alarms, in the Maintenance manual to display the Major alarm queue.

# 13. Connecting an External Alarm

This chapter describes connecting an external alarm. It includes:

- uses of an external alarm
- connecting an external alarm

#### 13.1 Uses of an External Alarm

The external alarm connector, labelled J7 on the Control card, allows connection to other devices for monitoring purposes. See Figure 13-1 for the location of connector J7 on the wall-mount unit.

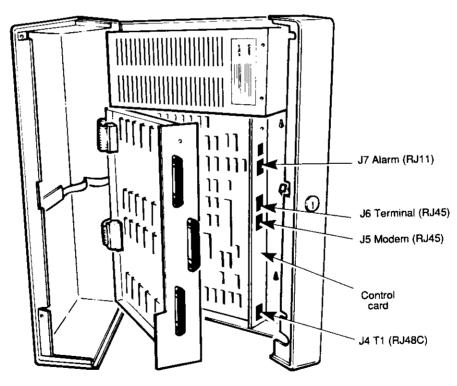


Figure 13-1: External Alarm Connector - Wall-mount Unit

Figure 13-2 shows the locations of connector J7, found on the back of the shelf assembly for the rack-mount drawer.

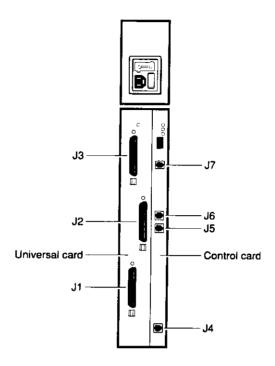


Figure 13-2: External Alarm Connector - Rack-mount Drawer

The external alarm provides two alarm functions:

- ☐ It monitors a circuit or piece of equipment (for example, an uninterruptable power source) that is part of your telecommunications system.
- ☐ It triggers an external signal, such as a light or buzzer, when System and/or Event alarms occur.

The external alarm connector is an RJ11 connector with a pin/signal assignment shown in Figure 13-3.

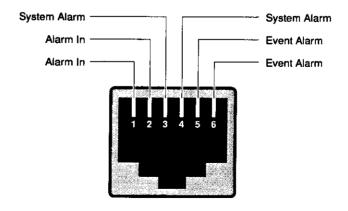


Figure 13-3: Pin/Signal Assignment of Connector J7

Figure 13-4 shows the alarm circuit.

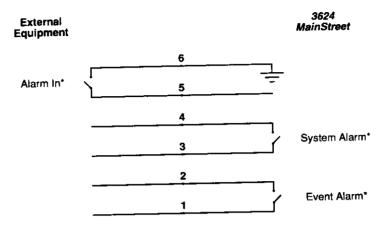


Figure 13-4: External Alarm Circuit

The alarm state of the Alarm In pin can be configured as open or closed through the NMTI (see Chapter 2, Alarms, in the Maintenance manual).

#### 13.2 Connecting an External Alarm

The contact ratings for the System Alarm and Event Alarm pins are given in Table 13-1.

Table 13-1: Contact Ratings for the External Alarm Connector

Maximum Operating	Resistive Load		
Voltage	60 VAC, 60 VDC		
Current	0.4 A		

## To connect an external alarm

1. Attach one end of the RJ11 cable to connector J7 on the 3624.

Pin 1 is connected to Signal Ground (See Figure 13-3).

- 2. To monitor a circuit or piece of equipment, connect the "Alarm In" pins of connector J7 to the relay contacts of the circuit or equipment you want to monitor.
- 3. To trigger an external signal, connect the "System Alarm" and/or "Event Alarm" pins of connector J7 to the external device.



Newbridge has attempted to accurately describe the intended functionality and operational procedures of this product. However, Newbridge does not warrant that the product will meet your particular requirements or that the product will not be subject to modifications.

Selected functionality may not be available in this release. Please contact your Newbridge regional sales office for specific release dates.

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# 3624 MainStreet Intelligent T1 Channel Bank

Release 7 Generic 6107/6207

Configuration





## **Foreword**

The documentation set of the 3624 MainStreet Intelligent T1 Channel Bank contains the following manuals:

<u> </u>	Installation (Part number 95-B200-01-00-B)
<u> </u>	Configuration (Part number 95-B400-01-00-B)
<u>.</u>	Maintenance (Part number 95-B500-01-00-B)
<u> </u>	Quick Reference Guide (Part number 95-B450-01-00-B)
<u></u>	Node Configuration Forms (Part number 95-B460-01-00-B)
_	Ordering Information (Part number 95-B050-01-00-B)
_	Index (Part number 95-B005-01-00-B)
	Content Summary (Part number 95-B000-01-00-B)
	Content Summary (Part Rulliber 33-bood-or of b)

**Installation:** This manual provides the instructions required to install and set up the 3624 MainStreet.

**Maintenance:** This manual explains all maintenance functions and how to perform them.

**Quick Reference Guide:** This manual contains a summary of the configuration and maintenance commands.

**Node Configuration Forms:** This manual contains a series of forms to fill out for planning and recording the configuration settings.

**Ordering Information:** This manual lists the available 3624 parts and their ordering numbers.

**Index:** This manual contains the indexes for the Installation, Configuration and Maintenance manuals.

**Content Summary:** This manual provides a listing of the main content of the manuals in the documentation set.

#### Configuration

This manual includes programming the primary rate link, configuring the circuits on the link, defining the circuit cross-connection scheme, configuring the voice and data modules and specifying the system's timing source and recovery mechanism.

Not all 3624 MainStreet systems include all of the components or features described in this manual. The components included and the features supported depend on the type of system and the generic software. This documentation set describes software generics 6107 and 6207, Release 7.

This documentation set describes the management of the 3624 node using the NMTI. A node management session can be initiated from the 4600 MainStreet family of network managers. If you are using a network manager, the menus and screens displayed by the network management software are the similar to those described in this documentation. Refer to the 4600 documentation for more detailed information.

#### **Symbols**

Several symbols, explained below, are used in the 3624 documentation to draw your attention to important information.



DANGER: Danger indicates that the described activity or situation may pose a threat to personal safety.



WARNING: A warning indicates that the described activity or situation may/will cause equipment damage.



CAUTION: A caution indicates that the described activity or situation may/will cause service interruption.



NOTE: Notes provide information that is or may be of special interest.

# **Table of Contents**

Fore	word	;;;
	Configu	rationii
	Symbols	rationiv
Tabl	e of Cont	ents
A	In the	Beginning
A 1	The N	ode Management Terminal Interface
<b>A1.</b>		NIMTI Overview
	A1.1	Caron Dienlay
	A1.2	NIMTI Major Application Areas
	A1.3 A1.4	Notwork Management
		Logging On to the NMTI
	A1.5	Coffloye
	A1.6 A1.7	Varboard Entries
	A1.7 A1.8	Setting the Date - an Example
	A1.8 A1.9	Logging Off the NMTI
	A1.9 A1.10	Summary of NMTI Formats
В.	Node	Configuration
B1.	Serial	Ports
	B1.1	IntroductionB1-1
	B1.2	Davida Typa
	B1.3	Rand Pate
	B1.4	Flow Control
B2.	Date.	Time and Node Name
•	B2.1	Data
	B2.2	Time 2
	B2.3	Node NameB2-3
В3.	Syste	m Security
	B3.1	Acces Lovels
	B3.2	Suggested Definitions for Levels 4 through 1
	B3.3	Defining Access Levels
	B3.4	PasswordsB3-6

# C. Module and Circuit Configuration

C1.	Mod	ule Position Configuration
	C1.1	Module Position Identifiers
	C1.2	Displaying Module Positions
	C1.3	Configuring a Resource Module Position
	C1.4	Configuring an Interface Module Position
	C1.5	Quick Module Position Configuration
	C1.6	Naming a Module Position
		CI-11
C2.	Circu	it Numbering, Naming and Quick Configuration
	C2.1	Circuit Numbering
	C2.2	Circuit Names
	C2.3	Quick Circuit Configuration
		<u>C2-3</u>
C3.	Cross	-connecting Circuits
	C3.1	Simple Cross-connections
	C3.2	Quick Circuit Cross-connection
	C3.3	Disconnecting Circuits
	C3.4	Displaying Cross-connected Circuits
D. D1.	T1 Me D1.1 D1.2 D1.3	ary Rate Link Configuration  odule Operating Parameters  T1 Zero Code Suppression
D2.	D1.4	Naming the Primary Rate Link
D2.	11 C11	rcuit Operating Parameters
	D2.1	Robbed Bit Signalling
	D2.2	Data Bit InversionD2-2
	D2.3	Signalling TypeD2-3
	D2.4	T1 Fault Signalling
D3.	Trunk	Conditioning
	D3.1	
	D3.1 D3.2	Overview of Trunk Conditioning
	D3.2 D3.3	The Types of Trunk Conditioning
		Enabling and Disabling Trunk Conditioning
	D3.4 D3.5	Alarm Declaration Time

D4.	Enhanced Alarm Handling				
	D4.1 D4.2	Yellow Alarm Support for ESF Framing			
E.	Voice	e Modules			
E1.	LGS I	Module			
	E1.1	The LCS Module			
	E1.2	About Voice Operating Parameters			
	E1.3	Transmission Level Points			
	E1.4	Circuit Signalling Types			
	E1.5	LS_DNIS and GS_DNIS feature			
	E1.6	Fault SignallingE1-7			
E2.	I GF	Module			
<u> </u>	E2.1	The LCE Module			
	E2.1	About Voice Operating Parameters			
	E2.3	Transmission Level Points			
	E2.4	Circuit Signalling Types			
	E2.5	Fault SignallingE2-5			
E3.	F&N	I Module			
LO.	E3.1	The El-M Module E3-1			
	E3.2	About Voice Operating Parameters			
	E3.3	Audio Transmission			
	E3.4	Transmission Level Points			
	E3.5	Fault Signalling			
E4.	The	Manual Ringdown Module			
LŦ.	E4.1	The MPD Module			
	E4.1 E4.2	About Voice Operating Parameters			
	E4.3	Tennemicsion Level Points			
	E4.4	Fault SignallingE4-4			

#### F. Data Modules

F1.1       The DNIC Module.       F1-1         F1.2       About Data Operating Parameters       F1-2         F1.3       Device Mode       F1-2         F1.4       Device Gender       F1-3         F1.5       Duplex Method       F1-4         F1.6       RTS/CTS Delay       F1-5         F1.7       Control Signals       F1-6         F1.8       Data Structure (Asynchronous only)       F1-16         F1.9       Clocking (Synchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-10         F2.1       The RS-232 Direct Connect Module         F2.1       The RS-232 Down       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.2       About Data Operating Parameters       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.1	F1.	The I	ONIC Module
F1.2       About Data Operating Parameters       F1-2         F1.3       Device Mode       F1-2         F1.4       Device Gender       F1-3         F1.5       Duplex Method       F1-4         F1.6       RTS/CTS Delay       F1-5         F1.7       Control Signals       F1-6         F1.8       Data Structure (Asynchronous only)       F1-8         F1.9       Clocking (Synchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-10         F2.1       The RS-232 Direct Connect Module         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F3-1         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       Tax X.21 and		F1.1	The DNIC Module F1-1
F1.3       Device Mode       F1-2         F1.4       Device Gender       F1-3         F1.5       Duplex Method       F1-4         F1.6       RTS/CTS Delay       F1-5         F1.7       Control Signals       F1-6         F1.8       Data Structure (Asynchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-10         F1.10       Multi-drop Data Bridge       F1-10         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F3-1         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       About Data Operating Para		F1.2	
F1.4       Device Gender.       F1-3         F1.5       Duplex Method       F1-4         F1.6       RTS/CTS Delay       F1-5         F1.7       Control Signals.       F1-6         F1.8       Data Structure (Asynchronous only)       F1-6         F1.9       Clocking (Synchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-12         F2.         F2.       The RS-232 Direct Connect Module         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters.       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Mode       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       F3.2       About Data Operating Parameters       F3-1         F3.3       Device Gender </th <th></th> <th>F1.3</th> <th></th>		F1.3	
F1.5       Duplex Method       F1-4         F1.6       RTS/CTS Delay       F1-5         F1.7       Control Signals       F1-6         F1.8       Data Structure (Asynchronous only)       F1-8         F1.9       Clocking (Synchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-10         F2.1       The RS-232 Direct Connect Module         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       F3.2       About Data Operating Parameters       F3-1         F3.3       Device Gender       F3-2		F1.4	
F1.6       RTS/CTS Delay       F1-5         F1.7       Control Signals       F1-6         F1.8       Data Structure (Asynchronous only)       F1-10         F1.9       Clocking (Synchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-12         F2.         The RS-232 Direct Connect Module         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Gender       F3-2         F3.4       Device Gender       F3-3         F3.5		F1.5	
F1.7       Control Signals       F1-6         F1.8       Data Structure (Asynchronous only)       F1-8         F1.9       Clocking (Synchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-10         F2.1       The RS-232 Direct Connect Module         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1         The X.21 and V.35 DCMs       F3-1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Gender       F3-3         F3.4       Device Gender       F3-3         F3.5       Duplex Method       <		F1.6	
F1.8       Data Structure (Asynchronous only)       F1-8         F1.9       Clocking (Synchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-12         F2.1       The RS-232 Direct Connect Module         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-4         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       F3.2       About Data Operating Parameters       F3-1         F3.3       Device Gender       F3-2		F1.7	Control SignalsF1-6
F1.9       Clocking (Synchronous only)       F1-10         F1.10       Multi-drop Data Bridge       F1-12         F2.         The RS-232 Direct Connect Module         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       The X.21 and V.35 Direct Connect Modules         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.		F1.8	Data Structure (Asynchronous only) F1-8
F1.10       Multi-drop Data Bridge       F1-12         F2.       The RS-232 Direct Connect Module         F2.1       The RS-232 DCM       F2-1         F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       The X.21 and V.35 Direct Connect Modules         F3.1       F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only) <td< th=""><th></th><th>F1.9</th><th>Clocking (Synchronous only)</th></td<>		F1.9	Clocking (Synchronous only)
F2.1       The RS-232 DCM       .F2-1         F2.2       About Data Operating Parameters       .F2-1         F2.3       Device Mode       .F2-2         F2.4       Device Gender       .F2-3         F2.5       Duplex Method       .F2-3         F2.6       RTS/CTS Delay       .F2-4         F2.7       Control Signals       .F2-5         F2.8       Data Structure (Asynchronous only)       .F2-6         F2.9       Clocking (Synchronous only)       .F2-8         F2.10       Multi-drop Data Bridge       .F2-10          F3.1       The X.21 and V.35 DCMs       .F3-1         F3.2       About Data Operating Parameters       .F3-1         F3.3       Device Mode       .F3-2         F3.4       Device Gender       .F3-3         F3.5       Duplex Method       .F3-3         F3.5       Duplex Method       .F3-4         F3.6       RTS/CTS Delay       .F3-5         F3.7       Control Signals       .F3-6         F3.8       Data Structure (Asynchronous only)       .F3-7         F3.9       Clocking (Synchronous only)       .F3-7         F3.10       Multi-drop Data Bridge       .F3-11 <td< th=""><th></th><th>F1.10</th><th>Multi-drop Data Bridge</th></td<>		F1.10	Multi-drop Data Bridge
F2.1       The RS-232 DCM       .F2-1         F2.2       About Data Operating Parameters       .F2-1         F2.3       Device Mode       .F2-2         F2.4       Device Gender       .F2-3         F2.5       Duplex Method       .F2-3         F2.6       RTS/CTS Delay       .F2-4         F2.7       Control Signals       .F2-5         F2.8       Data Structure (Asynchronous only)       .F2-6         F2.9       Clocking (Synchronous only)       .F2-8         F2.10       Multi-drop Data Bridge       .F2-10          F3.1       The X.21 and V.35 DCMs       .F3-1         F3.2       About Data Operating Parameters       .F3-1         F3.3       Device Mode       .F3-2         F3.4       Device Gender       .F3-3         F3.5       Duplex Method       .F3-4         F3.6       RTS/CTS Delay       .F3-5         F3.7       Control Signals       .F3-6         F3.8       Data Structure (Asynchronous only)       .F3-7         F3.9       Clocking (Synchronous only)       .F3-7         F3.10       Multi-drop Data Bridge       .F3-11         F3.11       Overview of Super-rate Circuits       .F3-13 <td>F2.</td> <td>The I</td> <td>RS-232 Direct Connect Module</td>	F2.	The I	RS-232 Direct Connect Module
F2.2       About Data Operating Parameters       F2-1         F2.3       Device Mode       F2-2         F2.4       Device Gender       F2-3         F2.5       Duplex Method       F2-3         F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10          F3.1       The X.21 and V.35 DCMs       F3-1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-7         F3.10       Multi-drop Data Bridge       F3-11         F3.11       F3.12       Module Position Configuration       F3-14			
F2.3         Device Mode         F2-2           F2.4         Device Gender         F2-3           F2.5         Duplex Method         F2-3           F2.6         RTS/CTS Delay         F2-4           F2.7         Control Signals         F2-5           F2.8         Data Structure (Asynchronous only)         F2-6           F2.9         Clocking (Synchronous only)         F2-8           F2.10         Multi-drop Data Bridge         F2-10           F3.1         The X.21 and V.35 DCMs         F3-1           F3.2         About Data Operating Parameters         F3-1           F3.3         Device Mode         F3-2           F3.4         Device Gender         F3-3           F3.5         Duplex Method         F3-4           F3.6         RTS/CTS Delay         F3-5           F3.7         Control Signals         F3-6           F3.8         Data Structure (Asynchronous only)         F3-7           F3.9         Clocking (Synchronous only)         F3-7           F3.10         Multi-drop Data Bridge         F3-11           F3.10         Multi-drop Data Bridge         F3-11           F3.11         Module Position Configuration         F3-15			
F2.4         Device Gender         F2-3           F2.5         Duplex Method         F2-3           F2.6         RTS/CTS Delay         F2-4           F2.7         Control Signals         F2-5           F2.8         Data Structure (Asynchronous only)         F2-6           F2.9         Clocking (Synchronous only)         F2-8           F2.10         Multi-drop Data Bridge         F2-10           F3.1         The X.21 and V.35 DCMs         F3-1           F3.2         About Data Operating Parameters         F3-1           F3.3         Device Mode         F3-2           F3.4         Device Gender         F3-3           F3.5         Duplex Method         F3-4           F3.6         RTS/CTS Delay         F3-5           F3.7         Control Signals         F3-6           F3.8         Data Structure (Asynchronous only)         F3-7           F3.9         Clocking (Synchronous only)         F3-7           F3.10         Multi-drop Data Bridge         F3-11           F3.11         F3.12         Module Position Configuration         F3-13           F3.13         Setting the Super-rate Interface Speed         F3-15			Device Mode
F2.5         Duplex Method         F2-3           F2.6         RTS/CTS Delay         F2-4           F2.7         Control Signals         F2-5           F2.8         Data Structure (Asynchronous only)         F2-6           F2.9         Clocking (Synchronous only)         F2-8           F2.10         Multi-drop Data Bridge         F2-10           F3.1         The X.21 and V.35 DCMs         F3-1           F3.2         About Data Operating Parameters         F3-1           F3.3         Device Mode         F3-2           F3.4         Device Gender         F3-3           F3.5         Duplex Method         F3-4           F3.6         RTS/CTS Delay         F3-5           F3.7         Control Signals         F3-6           F3.8         Data Structure (Asynchronous only)         F3-7           F3.9         Clocking (Synchronous only)         F3-9           F3.10         Multi-drop Data Bridge         F3-11           F3.11         Overview of Super-rate Circuits         F3-13           F3.12         Module Position Configuration         F3-14           F3.13         Setting the Super-rate Interface Speed         F3-15			Device Gorder F2-2
F2.6       RTS/CTS Delay       F2-4         F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 DCMs       F3-1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-5         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			Dunley Method E2-3
F2.7       Control Signals       F2-5         F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 DCMs       F3-1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			RTS/CTS Delay 52.4
F2.8       Data Structure (Asynchronous only)       F2-6         F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10            F3.       The X.21 and V.35 Direct Connect Modules         F3.1       The X.21 and V.35 DCMs       F3-1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			Control Signals
F2.9       Clocking (Synchronous only)       F2-8         F2.10       Multi-drop Data Bridge       F2-10         F3.       The X.21 and V.35 Direct Connect Modules         F3.1       The X.21 and V.35 DCMs       .F3-1         F3.2       About Data Operating Parameters       .F3-1         F3.3       Device Mode       .F3-2         F3.4       Device Gender       .F3-3         F3.5       Duplex Method       .F3-4         F3.6       RTS/CTS Delay       .F3-5         F3.7       Control Signals       .F3-6         F3.8       Data Structure (Asynchronous only)       .F3-7         F3.9       Clocking (Synchronous only)       .F3-9         F3.10       Multi-drop Data Bridge       .F3-11         F3.11       Overview of Super-rate Circuits       .F3-13         F3.12       Module Position Configuration       .F3-14         F3.13       Setting the Super-rate Interface Speed       .F3-15			Data Structure (Asynchronous only)
F2.10       Multi-drop Data Bridge       F2-10         F3.1       The X.21 and V.35 DCMs       F3-1         F3.1       The X.21 and V.35 DCMs       F3-1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			Clocking (Synchronous only)
F3.1       The X.21 and V.35 DCMs       F3-1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15		F2.10	Multi-drop Data Bridge
F3.1       The X.21 and V.35 DCMs       F3-1         F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15	F3.	The X	21 and V 35 Direct Connect Modules
F3.2       About Data Operating Parameters       F3-1         F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			
F3.3       Device Mode       F3-2         F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			
F3.4       Device Gender       F3-3         F3.5       Duplex Method       F3-4         F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			Device Mode
F3.5         Duplex Method         F3-4           F3.6         RTS/CTS Delay         F3-5           F3.7         Control Signals         F3-6           F3.8         Data Structure (Asynchronous only)         F3-7           F3.9         Clocking (Synchronous only)         F3-9           F3.10         Multi-drop Data Bridge         F3-11           F3.11         Overview of Super-rate Circuits         F3-13           F3.12         Module Position Configuration         F3-14           F3.13         Setting the Super-rate Interface Speed         F3-15			
F3.6       RTS/CTS Delay       F3-5         F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			Dunley Method E2 4
F3.7       Control Signals       F3-6         F3.8       Data Structure (Asynchronous only)       F3-7         F3.9       Clocking (Synchronous only)       F3-9         F3.10       Multi-drop Data Bridge       F3-11         F3.11       Overview of Super-rate Circuits       F3-13         F3.12       Module Position Configuration       F3-14         F3.13       Setting the Super-rate Interface Speed       F3-15			RTS/CTS Delay F2.5
F3.8 Data Structure (Asynchronous only)			Control Signals
F3.9 Clocking (Synchronous only) F3-9 F3.10 Multi-drop Data Bridge F3-11 F3.11 Overview of Super-rate Circuits F3-13 F3.12 Module Position Configuration F3-14 F3.13 Setting the Super-rate Interface Speed F3-15			Data Structure (Asynchronous only)
F3.10 Multi-drop Data Bridge			Clocking (Synchronous only)
F3.11 Overview of Super-rate Circuits F3.12 Module Position Configuration F3-14 F3.13 Setting the Super-rate Interface Speed F3-15			Multi-drop Data Bridge
F3.12 Module Position Configuration F3-14 F3.13 Setting the Super-rate Interface Speed F3-15			
F3.13 Setting the Super-rate Interface SpeedF3-15			Module Position Configuration
			Setting the Super-rate Interface Speed

F4.	The OC F4.1 F4.2 F4.3 F4.4 F4.5	CU Module       F4-1         The OCU Modules       F4-2         About Data Operating Parameters       F4-2         Interface speed       F4-3         Switched 56 Data Service       F4-3         Fault Signalling       F4-4
F5.	<b>The 4W</b> F5.1	TO Module  The 4W TO ModuleF5-1
	F5.2 F5.3	About Voice Operating Parameters
G.	Rate A	Adaption
G1.	Transp	parent Rate Adaption
	G1.1	What is Rate Adaption?
	G1.2	Overview of Transparent Rate AdaptionG1-2
	G1.3	Transport Bandwidth
	G1.4	Transport Position
G2.	HCM !	Rate Adaption
	G2.1	What is Rate Adaption?
	G2.2	Overview of HCM Rate Adaption
	G2.3	Transport Bandwidth
	G2.4	Transport Position
	G2.5	Interface Speed
	G2.6	Signalling
	G2.7	Transport Bandwidth, Transport Position and Data Position
	G2.8	Transport bandwidth, Transport Foother and 2 am 1
G3.	DDS I	Rate Adaption
	G3.1	What is Rate AdaptionGo-1
	G3.2	Overview DDS Rate Adaption
	G3.3	Interface Speed
н.	Timin	eg
H1.	Syster	n Timing
111.	H1.1	Viewing System Timing
	H1.2	Failure Threshold/Automatic Disable
	H1.3	Failure RecoveryH1-4

#### NT\_( . 1 N#

1.	Nett	work Management	
I1.	Con	figuration for Network Management	
	I1.1	Assigning a Node Number	11-1
	I1.2	Setting the Network Operations Center Number	
	I1.3	Configuring the Communication Path	I1-3
	I1.4	Logging Alarms	
List	of F	igures	
Figu	re	Title	

#### A1-1 A1-2 B1-1 Serial Ports on the Wall-mount Unit.......B1-1 B1-2 Serial Ports on the Rack-mount Drawer......B1-2 B2-1 Header Line and Node Settings ......B2-1 B3-1 NMTI Screen Showing Access Level Definition......B3-5 C1-1 Interface Module Position Numbering......C1-1 C1-2 C1-3Display for Interface Module LGS Variants......C1-5 C1-4 C1-5C1-6 D1-1 D3-1 D3-2 E1-1 F1-2 An Example of Receive TLPs.....E1-3 E1-3 E2-1 E2-2 E2-2 An Example of Receive TLPs......E2-3 E2-3 E3-1......E3-3 An Example of Receive TLPs......E3-3 E3-2 E3-3 E4-1 ..... E4-2 An Example of Receive TLPs.....E4-2 E4-2 E4-3 An Example of Transmit TLPs ..... E4-3 Transmit and Receive Clocks ...... F1-10 F1-1 F1-2 Multi-drop Data Bridge.....F1-12 F2-1

F3-1       Transmit and Receive Clocks       F3-11         F3-2       Multi-drop Data Bridge       F3-11         F3-3       Module Positions Configured as Reserved       F3-14         F3-4       Screen Display of Super-rate Speeds       F3-17         F3-5       Super-rate Connections       F3-22         F5-1       TLPs       F5-2         F5-2       An Example of Receive TLPs       F5-3		F2 10
F3-11	F2-2	Multi-drop Data BridgeF2-10
F3-2	F3-1	The small and Deceive ( locks
F3-3   Module Positions Configured as Reserved   F3-17     F3-4   Screen Display of Super-rate Speeds   F3-17     F3-5   Super-rate Connections   F3-25     F5-1   TLPs   F5-2     F5-2   An Example of Receive TLPs   F5-2     F5-3   An Example of Transmit TLPs   F5-3     G1-1   Transparent Channel   G1-2     G1-2   Transport Bandwidth Examples   G1-4     G1-3   Bit Numbering Conventions   G2-5     G2-1   HCM Frame   G2-2     G2-2   Transport Bandwidth   G2-4     G2-3   Bit Numbering Conventions   G3-5     G3-1   Format for a 56 kb /s DDS Channel   G3-2     G3-2   Rate Adaption Format for Sub-rate DDS Channels   G3-4     H1-1   Synchronization Display   H1-1     Network Management Communication Paths   H1-1    List of Tables   Title    A1-1   Summary of NMTI Formats   A1-13     B3-1   Suggested Access Level Definitions   B3-3     C1-1   Module Position Identifiers   G1-2     C1-2   Screen Display of Column Enteriess   G1-3     C1-3   Defaults for Module Types   G1-4     C2-1   Circuit Identifiers   G2-2     C3-1   Automatic Circuit Cross-Connections   G3-2     D2-1   Robbed Bit Signalling and Circuit Cross-connections   D2-1     D2-2   Data Inversion and Circuit Cross-connections   D2-1     D2-2   Data Inversion and Circuit Cross-connections   D3-5     E1-1   Permissible TLPs for LGS Module Circuits   E1-3     E1-1   Permissible TLPs for LGS Module Circuits   E1-3     E1-2   Signalling Type Description for the LGS Module Circuits   E1-3     E2-2   Signalling Type Description for the LGS Module Circuits   E2-4     E3-1   Permissible TLPs for LGE Module Circuits   E3-4     E4-3   Parmis E1-1   Parmis E1-1     E4-3   Parmis E1-1   Parmis E1-1     E1-1   Permissible TL	F3-2	Marilli Anna Data Bridge
F3-4   Screen Display of Super-rate Speeds	F3-3	Market Desitions Configured as Reserved
F3-5   Super-rate Connections   F5-2   F5-1   TLPs   F5-2   F5-2   An Example of Receive TLPs   F5-2   F5-3   An Example of Transmit TLPs   F5-3   F5-3   G1-2   Transport Bandwidth Examples   G1-4   F5-3   G1-2   Transport Bandwidth Examples   G1-4   F5-2   G2-2   Transport Bandwidth   G2-4   F5-3   G2-2   G2-2   Transport Bandwidth   G2-4   F5-3   G2-2   G2-4   G2-4   G2-4   F5-3   Bit Numbering Conventions   G3-2   F5-3   F5-3   G2-4   G2-4   F5-3   Bit Numbering Conventions   G3-2   F5-4   Permissible TLPs for LGE Module Circuits   G2-4   F5-5   G2-4   Permissible TLPs for LGE Module Circuits   G2-4   F5-5   G2-4   Permissible TLPs for E&M Circuits   G2-4   F5-6   G2-6   G2-6   G2-6   G2-6   F5-7   Permissible TLPs for E&M Circuits   G2-4   F5-7   F5-7   G2-7   G2-7   G2-7   G2-7   F5-7   Permissible TLPs for E&M Circuits   G2-4   F5-7   F5-7   G2-7   G2-7   G2-7   G2-7   G2-7   F5-7   Permissible TLPs for E&M Circuits   G2-4   F5-7   G2-7   G2-7   G2-7   G2-7   G2-7   G2-7   F5-7   Permissible TLPs for E&M Circuits   G2-4   F5-7   G2-7	F3-4	C Display of Super-rate Speeds
F5-1	F3-5	Comercial Connections
F5-2	F5-1	TT D.
F5-3	F5-2	A. Evennels of Pagaiya TI Ps
G1-2 Transport Bandwidth Examples	F5-3	An Example of Transmit TLPs
G1-2 Transport Bandwidth Examples	C1 1	Transparent Channel
G1-3         Bit Numbering Conventions         G2-2           G2-1         HCM Frame         G2-2           G2-3         Bit Numbering Conventions         G2-5           G3-1         Format for a 56 kb/s DDS Channel         G3-2           G3-2         Rate Adaption Format for Sub-rate DDS Channels         G3-4           H1-1         Synchronization Display         H1-1           I1-1         Network Management Communication Paths         I1-4           List of Tables           Table         Title           A1-1         Summary of NMTI Formats         A1-13           B3-1         Suggested Access Level Definitions         B3-3           C1-1         Module Position Identifiers         C1-2           C1-2         Screen Display of Column Enteriess         C1-3           C1-3         Defaults for Module Types         C1-4           C2-1         Circuit Identifiers         C2-2           C3-1         Automatic Circuit Cross-Connections         C3-2           D2-1         Robbed Bit Signalling and Circuit Cross-connections         D2-1           D2-2         Data Inversion and Circuit Cross-connections         D2-2           D3-1         Occurrence and Clearing of Alarms         D3-5	-	Townset Bandwidth Evamples
G2-1         HCM Frame         G2-4           G2-2         Transport Bandwidth         G2-4           G2-3         Bit Numbering Conventions         G2-5           G3-1         Format for a 56 kb/s DDS Channel         G3-2           G3-2         Rate Adaption Format for Sub-rate DDS Channels         G3-4           H1-1         Synchronization Display         H1-1           II-1         Network Management Communication Paths         II-4           List of Tables         II-4           A1-1         Summary of NMTI Formats         A1-13           B3-1         Suggested Access Level Definitions         B3-3           C1-1         Module Position Identifiers         C1-2           C1-2         Screen Display of Column Enteriess         C1-3           C1-3         Defaults for Module Types         C1-4           C2-1         Circuit Identifiers         C2-2           C3-1         Automatic Circuit Cross-Connections         C3-2           D2-1         Robbed Bit Signalling and Circuit Cross-connections         D2-1           D2-2         Data Inversion and Circuit Cross-connections         D2-2           D3-1         Occurrence and Clearing of Alarms         D3-5           E1-1         Permissible TLPs for LGS Module C		D' Al-makering Conventions
G2-2         Transport Bandwidth         G2-5           G2-3         Bit Numbering Conventions         G2-5           G3-1         Format for a 56 kb/s DDS Channel         G3-2           G3-2         Rate Adaption Format for Sub-rate DDS Channels         G3-4           H1-1         Synchronization Display         H1-1           I1-1         Network Management Communication Paths         I1-4           List of Tables         III-4           A1-1         Summary of NMTI Formats         A1-13           B3-1         Suggested Access Level Definitions         B3-3           C1-1         Module Position Identifiers         C1-2           C1-2         Screen Display of Column Enteriess         C1-3           C1-3         Defaults for Module Types         C1-4           C2-1         Circuit Identifiers         C2-2           C3-1         Automatic Circuit Cross-Connections         C3-2           D2-1         Robbed Bit Signalling and Circuit Cross-connections         D2-1           D2-2         Data Inversion and Circuit Cross-connections         D2-2           D3-1         Occurrence and Clearing of Alarms         D3-5           E1-1         Permissible TLPs for LGS Module Circuits         E1-3           E1-2         S		TICM Enome
G2-3 Bit Numbering Conventions		Towns and Randwidth
G3-1 Format for a 56 kb/s DDS Channel		Die Niembering Conventions
G3-2 Rate Adaption Format for Sub-rate DDS Channels		Transaction a 56 kb/c DDS Channel
List of Tables         Title           A1-1         Summary of NMTI Formats		Rate Adaption Format for Sub-rate DDS Channels
List of Tables         Title           A1-1         Summary of NMTI Formats	H1-1	Synchronization DisplayH1-1
Table         Title           A1-1         Summary of NMTI Formats	I1-1	Network Management Communication PathsI1-4
B3-1 Suggested Access Level Definitions		
B3-1 Suggested Access Level Definitions		A 1 12
C1-1 Module Position Identifiers	A1-1	
C1-2Screen Display of Column Enteriess	<b>B</b> 3-1	
C1-2Screen Display of Column Enteriess	C1 1	Module Position Identifiers
C1-3 C2-1 C2-1 Circuit Identifiers C3-2 C3-1 Automatic Circuit Cross-Connections C3-2  D2-1 D2-2 Data Inversion and Circuit Cross-connections D2-2 D3-1 Occurrence and Clearing of Alarms D3-5  E1-1 Permissible TLPs for LGS Module Circuits E1-2 Signalling Type Description for the LGS Module Circuits E2-1 Permissible TLPs for LGE Module Circuits E2-2 Signalling Type Description for the LGE Module Circuits E2-3 E2-1 Permissible TLPs for E&M Circuits E3-4 E3-1 Permissible TLPs for E&M Circuits E3-4 E3-3 E4-3		Diaglary of Column Enteriess
C2-1 Circuit Identifiers	=	Defaults for Module Types
C3-1 Automatic Circuit Cross-Connections		Circuit Identifiers
D2-2 D3-1 D3-1 D3-1 D3-5  E1-1 Permissible TLPs for LGS Module Circuits E1-2 Signalling Type Description for the LGS Module Circuits E2-3 E2-1 E2-2 Signalling Type Description for the LGE Module Circuits E2-3 E2-1 Permissible TLPs for LGE Module Circuits E2-3 E2-1 Permissible TLPs for E&M Circuits E3-4 E3-1 D3-5  E1-3 Permissible TLPs for E&M Circuits E3-4 E3-6 E3-7 E3-8 E3-9 E3-9 E3-9 E3-9 E3-9 E3-9 E3-9 E3-9		Automatic Circuit Cross-Connections
D2-2 D3-1 D3-1 D3-1 D3-5  E1-1 Permissible TLPs for LGS Module Circuits E1-2 Signalling Type Description for the LGS Module Circuits E2-3 E2-1 E2-2 Signalling Type Description for the LGE Module Circuits E2-3 E2-1 Permissible TLPs for LGE Module Circuits E2-3 E2-1 Permissible TLPs for E&M Circuits E3-4 E3-1 D3-5  E1-3 Permissible TLPs for E&M Circuits E3-4 E3-6 E3-7 E3-8 E3-9 E3-9 E3-9 E3-9 E3-9 E3-9 E3-9 E3-9	D2 1	Robbed Bit Signalling and Circuit Cross-connections
D3-1 Occurrence and Clearing of Alarms		Robbet bit officiality and Circuit Cross connections D2-2
E1-1 Permissible TLPs for LGS Module Circuits		Lines inversion and Circilli Citys-Culticulums
E1-2 Signalling Type Description for the LGS Module Circuits	D3-1	Data Inversion and Circuit Cross-Confections
E1-2 Signalling Type Description for the LGS Module Circuits		Occurrence and Clearing of Alarms
E2-1 Permissible TLPs for LGE Module Circuits	E1-1	Occurrence and Clearing of Alarms
E2-2 Signalling Type Description for the LGE Module Circuits E3-4 E3-1 Permissible TLPs for E&M Circuits E4-3		Occurrence and Clearing of Alarms
E3-1 Permissible TLPs for E&M Circuits	E1-2	Occurrence and Clearing of Alarms
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	E1-2 E2-1 E2-2	Occurrence and Clearing of Alarms

		<del></del>
F1-1	Control Leads for the DNIC Module	<b>C</b> 1 '
F2-1	Control Leads for the RS-232 DCM	F1~ E2 3
F3-1	Control Leads for the X.21 and V.35 DCMs	F2 4
F3-2	Super-rate Speeds, T1 Circuits and Module Positions	F3_14
F3-3	Valid T1 Circuits Connections	F3-16
F3-4	Valid Module Positions	F3-20
F3-5	Messages for Incorrect Super-rate Connections	F3_23
F5-1	Permissible TLPs for 4W TO Circuits	F5-3
G1-1	Transport Bandwidth vs Transport Position for Transparent Rate Adap	tion C1.5
G2-1	Interface Speeds for HCM	G1-7
H1-1	Status Headings	H1-2

A. In the Beginning

# A1. The Node Management Terminal Interface

This chapter describes the Node Management Terminal Interface and how to use it. It includes:

- ☐ the Node Management Terminal Interface (NMTI)
- The instructions for logging on and off the NMTI
- ☐ the use of softkeys and keyboard keys to enter commands

#### A1.1 NMTI Overview

The Node Management Terminal Interface (NMTI) is the interface by which you set up, operate, monitor, and maintain the 3624 MainStreet Intelligent T1 Channel Bank.

The NMTI is the user interface. In technical terms, the NMTI is a software program that resides in the PROM (programmable read-only memory) module on the Control card. However, from the user's point of view the NMTI is a series of menus displayed on the screen of the device selected to be the node management terminal.

When you use the NMTI, you give the 3624 instructions using a combination of two methods:

- selecting softkeys
- making keyboard entries

A softkey is a keyboard key that has a different function associated with it at different times. A keyboard entry allows you to enter data using the keyboard keys. Both methods use the keyboard of the terminal and are explained in section A1.6, "Softkeys", and section A1.7, "Keyboard Entries", in this chapter.

Access levels and passwords are two security features for the NMTI. The six access levels (0 through 5) allow different users to access different functions of the 3624. Access levels 1 through 5 can be assigned passwords. Access levels and passwords are described in Chapter B3, System Security, in this manual.

#### A1.2 Screen Display

The NMTI screen display is 78 characters wide by 24 lines long and has five functional areas (see Figure A1-1). As you select softkeys or enter information, the screen area changes to display relevant information. The display areas are explained in the next sub-section. Sample data is included in the illustration.

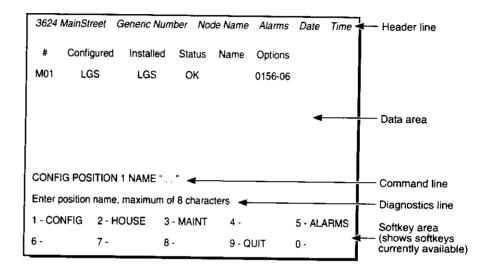


Figure A1-1: NMTI Screen Display



NOTE: If you are using a generic other than 6107 or 6207, the menus displayed on your terminal may differ slightly from those illustrated in the manual.

#### Display areas

**Header Line:** The header line occupies the top line of the screen and includes (from left to right):

- ☐ the product name ("3624 MainStreet")
- ☐ the software generic and revision number ("6X0Y-ab-cd")
- ☐ the node name (blank until entered)
- the number of alarms in the major alarm queue ("Alarms: #")
- ☐ the date ("No Date" or as entered)
- the time (time elapsed since last system reset or as entered)

To set the date, time and node name, see Chapter B2, Date, Time and Node Name, in this manual.

**Data Area:** The data area occupies the 18 lines below the header line and provides information associated with the current menu.

**Command Line:** The command line occupies the line below the data area. It displays softkey selections and keyboard entries as they are entered.

**Diagnostics Line:** The diagnostics line occupies the line below the command line. The NMTI uses this line to comment on your entries. It displays:

pro	mpts

- warnings
- error messages
- the valid range for numeric parameters

**Softkey Area:** The softkey area occupies the bottom two lines of the screen. Softkeys represent the commands or options currently available and change in name and function as you move through the NMTI menus (see section A1.6, "Softkeys", in this chapter).

A group of softkeys displayed at one time is called a *menu*. The group of five softkeys that appears when you log onto the 3624 (CONFIG, HOUSE, MAINT, ALARMS and QUIT) is called the *main menu*.

### A1.3 NMTI Major Application Areas

The NMTI has four major application areas: Configuration (CONFIG), Housekeeping (HOUSE), Maintenance (MAINT), and Alarms (ALARMS). Each area is represented by a softkey on the main menu screen.

**Configuration:** Configuration includes programming the primary rate link, configuring the circuits on the link, defining the circuit cross-connection scheme, configuring the voice and data modules and specifying the system's timing source and recovery mechanism.

**Housekeeping:** Housekeeping functions include setting the time and date, specifying the node name, configuring the serial ports, defining the parameters for access to the NMTI, and specifying information required by 4600-series *MainStreet* network management software.

**Maintenance:** Maintenance activities include performing system diagnostics, monitoring circuit status, performing loopbacks, testing circuits, backing up the system's database, and checking the status of the system's non-volatile memory (NVM).

Alarms: The NMTI continuously monitors the system for abnormal conditions and significant events and lists them in queues which can be viewed and edited under ALARMS. Other alarm functions include assigning a classification to each alarm type, configuring the external alarm, and selecting the method of logging alarms.

A. In the Beginning

### A1.4 Network Management

Configuration, continuous automatic monitoring and maintenance of the 3624 can be performed from a central location with 4600-series MainStreet network management software.

### A1.5 Logging Onto the NMTI

The following steps describe the log-on procedure for the first session after you have installed and commissioned the terminal as described in the Installation manual. Users logging on later may find some steps are not necessary, are slightly different, or are skipped altogether because previous users have changed the NMTI default configuration. The procedure includes notes on how the steps may vary.



NOTE: If the terminal is used regularly, steps 1 through 6 are unnecessary. Step 7 is the start of the log-on procedure for a regularly used system.

#### To log on

These steps may vary if 4600-series network manager software is installed on the network (see the network manager documentation for details).

- 1. Check that the power cables for both the 3624 MainStreet and the node management terminal are plugged into a power source.
- Check that the cable connecting the terminal to the 3624 MainStreet is properly installed.
- Turn on the 3624 MainStreet's power switch.

The unit performs diagnostic self-tests, as described in the Installation manual, Chapter 12. These tests should last less than one minute.

- 4. Turn on the node management terminal.
- 5. Check that the terminal is set for:
  - 8 data bits1 stop bit
  - no parity
  - no local echo
  - data rate of 9600 b/s (if the terminal is attached to connector J6), or
  - data rate of 1200 b/s (if the terminal is attached to connector J5)

- Wait until the seven-segment display on the Control card stops flashing a "d".
- 7. Press the Return key on the terminal at approximately 1-second intervals until the start-up message appears:

NEWBRIDGE 3624 MAINSTREET, GENERIC 6X0Y-ab-cd Copyright 1988 to 1991 Newbridge Networks Corporation. All rights reserved.

The "X0Y-ab-cd" is replaced by an alphanumeric string that describes the software generic and revision number.

If the message does not appear, check the connections and setup of the node management terminal.

The NMTI prompts:

#### ENTER LEVEL:

8. Enter a "5" and press the "Return" key (<5> <Return>).

Level 5 users have read and write access to all areas of the NMTI.

If this is not the first session on the 3624 and you have an access level, enter it.

The NMTI responds with the prompt:

#### ENTER PASSWORD:

9. Type "mainstreet" and press the "Return" key (<mainstreet> <Return>).

"Mainstreet" is the default password for all levels. Notice that the password is not displayed on the screen.

If the password is entered incorrectly, the system responds with **Incorrect Password**. By pressing <Return> the system begins again at Step 7.

If the password has been changed, consult your system manager and enter the password assigned to your access level.

The 3624 displays the screen illustrated in Figure A1-2.

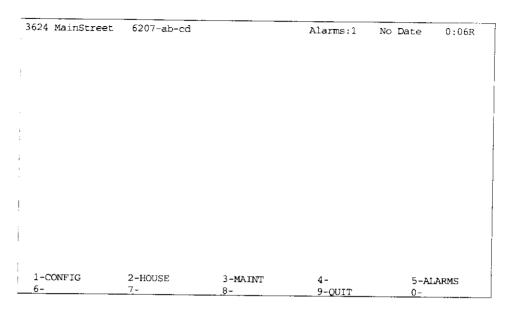


Figure A1-2: NMTI Main Menu

Look at the top of the screen (the header line) to see how many major/prompt alarms were raised by the 3624 on power-up.

The number of alarms is listed as 'Alarms: #'. Two alarms – 'System Restart (Active)' and 'Synch Source Changed' – are always raised on power-up.

If more than two alarms are raised, check the alarm queue. For a description of how to view the alarm queues and definitions of these alarms, see Chapter 2, Alarms, in the Maintenance manual.

### A1.6 Softkeys

A softkey is associated with a different function at different times. The function depends on previous softkey selections. For example, when you log onto the 3624, the "2" key is associated with the function HOUSE. When you select HOUSE, the function associated with the "2" key changes to SER\_PORT\_2. Press "2" again, and the function associated with the "2" key changes to PORT\_TYPE.

Softkeys are displayed at the bottom of the screen in the softkey area with the number appearing to the left of the softkey. For simplicity, the term *softkey* is used in this manual to represent both the number key (on the keyboard or the number pad) associated with a particular function and the function itself.

A group of softkeys displayed at one time is called a *menu*. The group of five softkeys that appears when you log on to the 3624 (CONFIG, HOUSE, MAINT, ALARMS and QUIT) is called the *main menu*.

In this manual, softkeys are written as they appear on the screen, which is generally in upper case (for example, CIRCUIT). Some softkeys contain underscores (for example, NVM\_DATA) and occasionally include hyphens (for example, END-TO-END) or obliques (for example, RTS/CTS).

### Selecting softkeys

In general, softkeys are selected by pressing a number key ("0" through "9") on the keyboard or the number pad.

To select a softkey when the *3624* is expecting a keyboard entry, press the "Escape" key (indicated as <Escape>) then the number key. The "Escape" key indicates to the *3624* that the subsequent number is a softkey selection rather than a keyboard entry.

For example, you want to connect all circuits on both links at one time in the menu CONFIG CONNECT. But the NMTI is expecting a circuit identifier ("??-??"). By entering <Escape> <1> (1 is the keyboard key for the softkey, ALL), you are able to connect all circuits at once.

Usually selection of a softkey leads to an update of the data area, a change in the softkeys available and/or an addition to the command line.

### Toggle softkeys

Some softkeys are toggled. When a toggle softkey is selected, the activity governed by the softkey changes to another state, usually the opposite of the original activity. The new state is generally indicated in the data area. The softkey label also changes.

For example, when you select MAINT DIAG, the softkey associated with the "3" key (DISABLE/ENABLE) is a toggle softkey. When you select DISABLE, background diagnostic tests are disabled and the softkey changes to read ENABLE. When you select ENABLE, background diagnostic tests are enabled and the softkey changes to read DISABLE.

### Softkey groups

Some softkeys are grouped. Only one softkey in a group can be selected at a time. The selected softkey disappears from the softkey area, and the selection is generally indicated in the data area.

For example, when you select HOUSE SER\_PORT\_1 BAUD\_RATE, five baud rates are displayed. The sixth (and selected) baud rate does not appear in the softkey area as an option, but it does appear in the data area. If you select a new baud rate, the corresponding softkey disappears from the softkey area, the new rate is displayed in the data area and the old rate reappears in the softkey area.

Most softkeys are added to the command line when they are selected to record what you have entered. Exceptions include MORE, CANCEL, QUIT, PROCEED and display softkeys.

A. In the Beginning

Display softkeys Some softkeys display information while you are entering an instruction. These softkeys change the display in the data area without interrupting the instruction. For example SHOW\_GROUP and SHOW\_CCT are display softkeys.

#### Undoing a selection

Selecting CANCEL undoes the last part of the instruction being entered. CANCEL is always associated with the "8" key.

### main menu

Returning to the If you are not at the main menu, selecting QUIT takes you back to the main menu. Selecting QUIT from the main menu logs you off the NMTI. QUIT is always associated with the "9" key.

> If an incorrect command sequence was entered, or if you decide not to execute the command, select CANCEL ("8") to cancel the command or QUIT ("9") to cancel the command and return to the main menu.

#### Executing an instruction

To execute an instruction, select PROCEED when you have finished entering an instruction. The PROCEED softkey is displayed in the softkey area only when it is required. PROCEED is always associated with the "0" key.

The NMTI prompts you to select the PROCEED softkey with the message "Press PROCEED to confirm change". Only the softkeys CANCEL, QUIT and PROCEED are displayed. After you select PROCEED, all softkeys disappear briefly and a message indicates the NMTI is executing the instruction. Then the menu you are most likely to use for the next operation appears. Part of the instruction remains on the command line, so that it does not have to be reentered.

For brevity, PROCEED is not included in the procedures described in this manual unless it affects the execution of the instruction.



NOTE: The Quick Reference Guide provides a listing of all softkeys.

### A1.7 Keyboard Entries

When the options available are too numerous to make softkeys practical, a keyboard entry is used to enter commands. For a keyboard entry, the alphanumeric keys on the terminal keyboard are used to enter information. Keyboard entries are required for circuit identifiers, circuit names, or a Transmission Level Point (TLP).

The NMTI indicates that it expects a keyboard entry in three ways.

- ☐ It displays a series of question marks or periods in quotation marks on the command line, for example, "??-??" or "...".
- ☐ It displays a prompt on the diagnostics line beginning with "Enter", for example, "Enter the acceptable number of failures per hour (range is 0 to 30)".
- ☐ It removes all softkeys except CANCEL, QUIT and display softkeys.

As you enter information, the prompt on the command line is replaced by the entry. Use the "Delete" (or "Backspace") key to correct typing errors.

In this manual, keyboard entries are indicated by text in angle brackets (< >). The text is written using italics, for example, < number > and < pp-c >.

### Keys with a name

Some keyboard keys have names, for example, "Return", 'Escape", "Control", "Shift", "Enter" "Backspace" and "Delete".

Pressing keys with names is indicated by using the full name of the key with the first letter capitalized and surrounded by angle brackets. For example, <Return> indicates that you press the "Return" key.

### Keys with a character

Most keys have an alphanumeric character on them, for example, "K", "7" and "-".

Pressing a key with a character is indicated with non-italicized upper case letters surrounded by angle brackets, for example, <CPSS> means to press the keys "C", "P", "S", and "S".

#### **Formats**

Most keyboard entries have specific formats in which the information must be entered. Sometimes the required format is indicated in the diagnostics line.

For example, the date for the header line must be entered in the format *<dd-MMM-yy>*, where *dd* represents the day of the month, *MMM* represents the first three letters of the month, and *yy* represents the last two digits of the year. The hyphens must also be entered, for example, May 13, 1991, is entered as *<*13-MAY-91>.

A. In the Beginning

In some cases, the format is a mixture of specific letters and variable information. For example, when configuring data circuits that use High Capacity Multiplexing (HCM) rate adaption, you must specify the bit position of the framing bit. The format for entering the bit positions is written <Ff-Bb>, that is, "F" and "B" must be typed and "f" and "b" represent variable information. The hyphen must be entered, for example, <F0-B7>.

### Executing a keyboard entry

To indicate that you have finished a keyboard entry, press <Return>. The "Return" key is included in the procedures described in this manual where required, since the NMTI does not prompt for it.

The 3624 can store up to 100 characters in its keyboard buffer, allowing you to type in commands or other key sequences before being prompted for them. You can clear the buffer by holding down the "Control" key and pressing the "X" key (<Control> <X>). All unexecuted commands are cancelled when the buffer is cleared.

### Refreshing the display

The terminal screen can be refreshed by pressing the "Escape" key, then the "R" key (<Escape> <R>). Refreshing the screen is useful in several situations:

J	if a	database	verification	is	in	progress

- if you are monitoring system alarms and want to update the information displayed
- if you are examining the signalling leads
- if a transmission error or some other event corrupts the information displayed

### A1.8 Setting the Date - an Example

The following example shows you how to move around the NMTI. We recommend you carry out the steps on your terminal as you read.

The example sets the date.

#### To set the date

1. Select HOUSE (press the "2" key).

Notice that "HOUSE" appears on the command line and the main menu is replaced by another menu.

### 2. Select DATE (press the "3" key).

Notice "DATE" is added to the command line after "HOUSE". The NMTI prompts you for a keyboard entry by displaying "..." on the command line. The diagnostics line displays the prompt:

Enter the date in the form dd-MMM-yy For example 09-JAN-87

where

dd = the day (2 digits) MMM = the month (3 letters) yy = the year (2 digits).

For example, May 27, 1991 is entered as 27-MAY-91.

As you type the entry, the prompt is replaced by the keys typed. To delete a typing error, press the Backspace key.

All softkeys except CANCEL and QUIT are removed.



NOTE: If you want to select CANCEL or QUIT at this point, you have to enter <Escape> <8> or <9>. If you simply enter <8> or <9>, the NMTI assumes the number is part of the date (a keyboard entry) and adds it to the command line.

### 3. Press the "Return" key (<Return>)

This indicates the end of the keyboard entry.

Information about the date reappears and the menu changes. The command and diagnostics lines appear as:

HOUSE DATE 27-MAY-91 Press PROCEED to confirm change.

4. Select PROCEED (press the "0" key).

After entering a command sequence, you must select PROCEED for the command to take effect.

The date on the header line changes to the date entered and the "HOUSE" menu is displayed.

5. Select QUIT (press the "9" key).

The main menu is displayed.

## Combining softkeys and keyboard entries

In general, a series of softkey selections and keyboard entries is written on one line with spaces between them. For example, to set the date is written as:

HOUSE DATE <dd-MMM-yy> <Return>

### A1.9 Logging Off the NMTI

You can log off the NMTI manually. You can also program the length of time after which the NMTI automatically logs off if there has been no activity. This prevents unauthorized use of an unattended terminal.

### To log off the NMTI

To log off from the NMTI, select QUIT.

To log off from the NMTI from any other menu, select QUIT twice.



NOTE: If the NMTI is expecting a data entry when you enter the first <9>, a <9> appears on the command line and the softkeys do not change. Instead, press the "Escape" key then <9>.

### Automatic log off

Five options are available:

- □ 5 minutes (5\_MIN)
- ☐ 10 minutes (10 MIN)
- ☐ 15 minutes (15\_MIN)
- □ 30 minutes (30 MIN)
- \_ . . . . . . . .

Default: 30 minutes (30\_MIN)

### To set the automatic log off

1. Enter:

HOUSE MORE SESSN\_TIME

no automatic log-off (NONE)

2. Select:

5\_MIN or 10\_MIN or 15\_MIN or 30\_MIN or NONE

The softkey that does not appear is already selected.

If you select NONE, the terminal stays logged onto the system until you log off manually (select QUIT from the main menu).

### A1.10 Summary of NMTI Formats

Table A1-1 summarizes the formats that are used in moving around the NMTI. <\*ltalics\*\* indicates a keyboard entry; ALL CAPITALS indicates a softkey number entry; <\*Capitalized Word\*\* indicates the actual name key entry.

Table A1-1: Summary of NMTI Formats

Activity	Format	Press
Enter a module identifier	<module identifier=""></module>	T1, DSP, or 1 to 12
Enter a circuit identifier	<t1-cc> or <pp-c></pp-c></t1-cc>	T1-1 to T1-24, 1-1 to 12-2 <i>or</i> 1-A, 1-B to 12-A, 12-B
To return to the main menu	QUIT	9
Log off the NMTI	QUIT	9
Log off the NMTI from any other menu	QUIT, QUIT	9, 9
Undo a selection	CANCEL	8
Execute a softkey instruction	PROCEED	0
Execute a keyboard instruction	<return></return>	Return key
Refresh the screen	<escape> <r></r></escape>	escape key, R
Delete a keyboard error	<delete> or <backspace></backspace></delete>	delete or backspace key
Clear keyboard buffer	<control> <x></x></control>	control key, X
Select a softkey when a keyboard entry is expected	<escape> <softkey number=""></softkey></escape>	escape key, keyboard number key

A. In the Beginning

			`

**B.** Node Configuration

### **B1.** Serial Ports

This chapter describes the configuration of the two serial ports on the 3624, including:

- the type of the connected device
- ☐ the baud rate
- ☐ the flow control

#### **B1.1** Introduction

The Control card has two serial ports. See Figures B1-1 and B1-2 for the location of the serial ports on the wall-mount unit and rack-mount drawer. The serial ports are found on the back of the rack shelf assembly. Serial Port 1 (labelled J6 Terminal) is configured as Data Communications Equipment (DCE). Serial Port 2 (labelled J5 Modem) is configured as Data Termination Equipment (DTE). Control signals (hardware flow control) are supported on Serial Port 2 only.

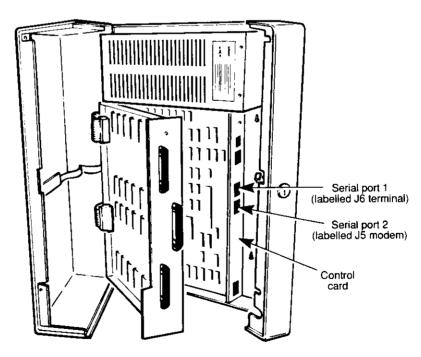


Figure B1-1: Serial Ports on the Wall-mount Unit

B. Node Configuration B1-1

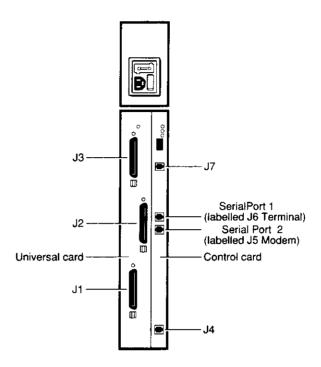


Figure B1-2: Serial Ports on the Rack-mount Drawer

The data format for both ports is:

- 8 data bits
- ☐ 1 stop bit
- ☐ no parity



NOTE: You may wish to leave the terminal or computer that is used for the node management session plugged into J5 or J6 for ease of operation after the connector is plugged into J2.

### **B1.2** Device Type

The serial ports must be configured for the type of device connected to the port or the communication protocol to be used with the port.

Three types of devices can be connected to a serial port:

- ☐ a VT100-compatible terminal (VT100)
- ☐ a printer (PRINTER)
- a personal computer (VT100, CPSS, CPSS\_LONG or CPSS\_MODEM)

Default: Serial Port 1: VT100

Serial Port 2: CPSS\_MODEM

These default allow local NMTI access (VT100-compatible terminal) on serial port 1 and 4600-series network manager remote access (via modem) on serial port 2.

If you change the device type for the serial port to which the node management terminal is connected, the display is updated, but the change does not take effect until you log off the NMTI.

#### VT100compatible terminal

A VT100-compatible ASCII terminal can be connected to a serial port directly or indirectly using an auto-answer Hayes-compatible modem. The terminal is used for NMTI sessions.

#### Printer

A printer can be connected to one of the serial ports so alarms can be printed out (see Chapter 2, Alarms, in the Maintenance manual).

### Personal computer

A personal computer can be connected to a serial port. The computer must be running terminal emulation software, communications software, or 4600-series network management software.

**Terminal Emulation Software:** A computer running terminal emulation software can connect to a serial port directly or via an auto-answer Hayes-compatible modem. NMTI sessions can then be carried out using the computer.

Communications Software: A computer running communications software must connect directly to a serial port for the 3624 to perform configuration database activities such as backing up, verifying and restoring. For details, see Chapter 5, Database Management, in the Maintenance manual. The computer can also be connected to a serial port via an auto-answer Hayes-compatible modern.

4600 Software: A computer running 4600-series network management software can connect to a serial port directly or via a Hayes-compatible modem. The 4600-series network manager can hold an NMTI session on the 3624. The port must send information to the 4600-series network manager using the Control Packet Switching System (CPSS) protocol. The extended link layer and network layer time outs required by an extended CPSS network are also available.



NOTE: A 4600-series network manager connected directly to a 3624 can back up, verify, and restore the configuration database. A 4600-series network manager connected to the 3624 via modem can back up, verify, but not restore the configuration database. For more details, see Chapter 5, Database Management, in the Maintenance manual.

The 3624 can be configured to log alarms to the 4600-series network manager whether it is connected directly or via modem. For details, see Chapter 2, Alarms, in the Maintenance manual.

### To set the device 1. type

1. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2

The NMTI indicates to which port the node management terminal is connected and displays the current settings for both ports.

2. Select:

PORT\_TYPE



NOTE: If you change the port type for the serial port the terminal is connected to, the screen display is updated but the change of port type does not take effect until you log off the NMTI.

3a. For a VT100-compatible terminal (connected directly or via modem), select:

VT100

**3b.** For a printer, select:

**PRINTER** 

**3c.** For a computer running terminal emulation software (connected directly or via modem), select:

VT100

**3d.** For a computer running communications software (connected directly or via modem), select:

VT100

**3e.** For a computer running *4600*-series network manager software connected directly, select:

**CPSS** 

**3f.** For a computer running 4600-series network manager software operating over an extended CPSS network, select:

CPSS\_LONG

B1-5

**3g.** For a computer running *4600*-series network manager software connected via modem, select:

CPSS\_MODEM

The softkey that does not appear is already selected.

#### **B1.3** Baud Rate

Set the baud rate to match that of the device connected to the serial port. The baud rates supported are:

- $\Box$  300 b/s (300)
- $\bigcirc$  600 b/s (600)
- □ 1200 b/s (1200)
- □ 2400 b/s (2400)
- □ 4800 b/s (4800)
- □ 9600 b/s (9600)

Default: Serial Port 1: 9600 b/s (9600)

Serial Port 2: 1200 b/s (1200)

If you use a serial port to backup, verify or restore the configuration database to a personal computer running communications software or 4600-series network manager software, flow control is required for baud rates of 2400 or higher. See section B1.4, "Flow Control", in this chapter and Chapter 5, Database Management, in the Maintenance manual.

If you change the baud rate of the serial port to which the terminal running the NMTI session is connected, the setting changes when you execute the instruction by selecting PROCEED. You must then change the baud rate of the terminal to match the new setting.

### To set the baud rate

1. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2

The NMTI indicates to which port the node management terminal is connected and displays the current settings for both ports.

2. Select:

BAUD\_RATE

Select the baud rate to be used with the port:

300 or 600 or 1200 or 2400 or 4800 or 9600

#### **B1.4** Flow Control

Bidirectional flow control can be set for both serial ports. The three flow control settings are:

- ☐ software flow control (XON/XOFF)
- ☐ hardware flow control (DTR)
- □ no flow control (NONE)

Default: no flow control (NONE)

Serial Port 1 supports software flow control (XON/XOFF and NONE). Serial Port 2 supports software flow control and hardware flow control (XON/XOFF, DTR, and NONE).

If you use a serial port to backup, verify or restore the configuration database to a personal computer running communications software, flow control is required for baud rates of 2400 or higher.



NOTE: Setting the flow control has no effect on serial ports configured as CPSS, CPSS\_LONG or CPSS\_MODEM; that is, flow control is not required for backing up, verifying or restoring the configuration database to a personal computer running 4600-series network manager software.

### To configure flow control

1. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2

The NMTI indicates to which port the node management terminal is connected and displays the current settings for both ports.

2. Select:

FLOW\_CTRL

3. Select the type of flow control to be used with the port:

NONE or XON/XOFF or DTR

The softkey that does not appear is already selected.

B2-1

### **B2.** Date, Time and Node Name

This chapter describes setting:

- ☐ the date
- ☐ the time
- the node name

The date, time and node name appear in the header line of the NMTI screen. See Figure B2-1.

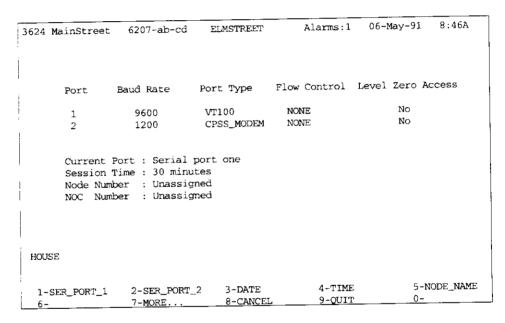


Figure B2-1: Header Line and Node Settings



NOTE: Date and time are lost when the 3624 is powered down or when the power supply is lost.

#### B2.1 Date

"No Date" appears in the header line until you set the date.

#### To set the date

#### 1. Enter:

#### HOUSE DATE

The system prompts you to enter the date in the form <dd-MMM-yy>, where

dd = the day (two digits including leading 0s)

*MMM* = the month (the first three letters)

yy = the year (two digits)

For example, May 6, 1991, would be entered as <06-MAY-91>.

#### 2. Enter the date:

```
<dd-MMM-yy> <Return>
```

The date appears in the header line.

#### B2.2 Time

Until the time is set, the NMTI screen displays, in the header line, the time elapsed since a system reset. Elapsed time is displayed in a 12-hour format followed by the indicator "R". For instance, if the header line shows 10:03R, it indicates that the system was reset 10 hours and 3 minutes ago.

The actual time appears in the header line in a 12-hour format followed by an "A" or "P" indicator for A.M. or P.M. respectively.

### To set the time

#### 1. Enter:

#### HOUSE TIME

The NMTI prompts you to enter the time in the form <*hh:mm*A> or <*hh:mm*P>, where

hh = the hour (1 or 2 digits; leading 0s not required)

mm = the minute (2 digits)

A = A.M.P = P.M.

For example, 3:17 PM would be entered as <3:17P>. If you do not enter <A> or <P>, the NMTI assumes an "A".

### 2. Enter the time:

<hh:mmA> or <hh:mmP> <Return>

Notice that the time appears in the header line.

### **B2.3** Node Name

The node name is the identification label of the 3624 used in a network managed by 4600-series network management software. Until a node name has been assigned to a node, the node name does not appear in the header line.

You can assign a name to a node (up to 12 alphanumeric characters, no spaces or underscores). In Figure B2-1, "ELMSTREET" is the node name.

The node name is not saved as part of a configuration database backup nor is it affected when a database is restored. That is, when a database is loaded into a node, the node name stays as configured. This helps prevent two or more nodes in a network from having the same node name.

### To set the node name

#### 1. Enter:

HOUSE NODE\_NAME

The NMTI prompts you to enter the name. It can be up to 12 alphanumeric characters (no spaces or underscores).

2. To enter a node name:

<name> <Return>

Notice that the node name appears in the header line.

To delete a node name without assigning another one, enter:

<Return>

The node name disappears from the header line.

B. Node Configuration

### **B3.** System Security

	1 .	
1 1	ah amtar	contains:
1 1115	thanner	tunnanns.
11110	CILCIPICAL	

- ☐ a description of the access levels
- instructions for defining each level's access
- a suggested definition for each level
- instructions for assigning passwords

#### **B3.1** Access Levels

The 3624 has six access levels (levels 0 through 5). Using access levels, you can allow different people to configure, operate and monitor specified functions of the 3624.

#### Level 5

Level 5 is intended for the system manager. Level 5 users have read/write access to all NMTI functions. In addition, only level 5 users can modify access level definitions and change passwords. Level 5 cannot be redefined.

Level 5 can be assigned a password (see section B3.4, "Passwords", in this chapter).

To log on as a level 5 user, enter <5> when prompted for the level during log on, then enter the level 5 password. The default password is "MAINSTREET".

### Levels 4 through 1

Levels 4 through 1 can be assigned passwords (see section B3.4, "Passwords", in this chapter).

To log on as a level 4, 3, 2, or 1 user, enter <4>, <3>, <2> or <1> when prompted for the level during log on, then enter the appropriate password. The default password is "MAINSTREET".

Levels 4 through 1 can be defined to give user's access to certain NMTI functions and not to others (see section B3.3, "Defining Access Levels", in this chapter). Access can be defined as:

- no access, which means the user has no access to the function (NO\_ACCESS);
- read-only access, which means the user can read but not make changes to the function (READ\_ONLY); or
- read/write access, which means the user can read and make changes to the function (READ/WRITE).

Default: read/write access (READ/WRITE)

B. Node Configuration B3-1

#### Level 0

Level 0 is a read-only access level for which no password is required.

Both serial ports can be configured for one of:

- ☐ level 0 access (LEVEL\_0)
- ☐ no level 0 access (NO\_LEVEL\_0)

Default: no level 0 access (NO\_LEVEL\_0)

If the serial port to which the node management terminal is connected is configured for level 0 access, anyone can look at the NMTI settings by entering <0> when prompted for the level during log on. The system does not prompt for a password.

Level 0 users have access to all NMTI softkeys except PROCEED. Only level 5 users can configure a port as level 0 (this softkey does not appear for users logged on at other levels).

If a serial port is configured for no level 0, users have to give one of the five access level passwords to log on to the node management terminal. The read and write privileges defined for that level are then available. The setting of level 0 has no effect on the settings for levels 1 to 5.

Level 0 cannot be redefined or assigned a password.

### To set level 0 access

1. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2

**2a.** To configure a serial port for level 0 access, select:

LEVEL\_0

**2b.** To configure a serial port for no level 0 access, select:

NO\_LEVEL\_0

The LEVEL\_0/NO\_LEVEL\_0 softkey is a toggle softkey; the softkey that does not appear is already selected.



NOTE: The LEVEL\_0 /NO\_LEVEL\_0 softkey appears only if you are logged on as a level 5 user.

### **B3.2** Suggested Definitions for Levels 4 through 1

To simplify the process of defining access levels, use the suggested definitions for access levels 4 through 1 listed in Table B3-1. You can use these definitions for your system or as a basis for defining your own access levels.

Table B3-1: Suggested Access Level Definitions

	Softkeys			Suggested Access		
			4	3	2	1
CONFIG	POSITION CIRCUIT CONNECT SYNCH		R/W R/W R/W	RW RW RW RW	PO PO PO PO	RO RO RO RO
HOUSE	SER_PORT_1 SER_PORT_2 DATE TIME NODE_NAME MORE	SESSN_TIME CHNG_PSSWD NODE_NUM NOC_NUM	RW RW RW RW RW n/a* RW	R/W R/W R/W R/O R/O n/a* R/O R/O	PO PO R/W R/W PO PO n/a* PO PO	RO RO RO RO RO RO n/a* RO RO
MAINT	DIAG DISPLAY UNDO_MAINT ON_CIRCUIT ON_MODULE MORE	BACKUP RESTORE VERIFY VIEWNET NVM_DATA	R/W R/W R/W R/W R/W R/W R/W n/a**	R/W R/W R/W R/W R/W R/W R/W n/a**	R/W R/W R/W R/W R/O R/O R/O n/a** n/a**	RO RO RO RO RO RO RO RO n/a**
ALARMS	MAJOR MINOR DIAGNOSTIC EXTNL_ALRM CONFIG MORE	LOGGING	R/W R/W R/W R/W R/W	R/W R/W R/W R/W R/W	R/W R/W R/W R/W R/W R/W	RW RW RW RO RO RO

RO = Read Only

R/W = Read/Write

The type of users who would use these different levels are:

**Level 4:** Level 4 can be used for the system manager who doesn't modify access level definitions or change passwords. The main tasks of the level 4 users may also be managing the housekeeping and maintenance functions.

**Level 3:** Level 3 can be used for the network configuration operator, whose main task is to configure the network interfaces and signalling or data processing applications of the system. In addition, the level 3 user may also manage the housekeeping functions related to the serial ports, time setting and setting the inactivity time out (automatic log off time).

B. Node Configuration

<sup>\*</sup> This softkey appears for level 5 users only

<sup>\*\*</sup> These keys are, by definition, read only functions

**Level 2:** Level 2 can be used for the network performance operator, whose main task is to manage alarms and perform maintenance functions such as diagnostic tests and circuit maintenance.

**Level 1:** Level 1 can be used for network performance personnel, whose main task is to acknowledge and clear alarms.

### **B3.3** Defining Access Levels

When you define access levels, you can leave the access as read/write or change it to read-only or to no access.



NOTE: Only level 5 users can modify access level definitions.

For levels 4 through 1, access can be defined for each of the softkeys listed in Table B3-1 except CHNG\_PSSWD. Access levels can also be defined at the main menu level, which is the access level immediately after logging on. If you define a level's access as no access at the main menu level, the user can only log off.

The access definition for a softkey over-rides the access level of any softkeys underneath it if the definition is more restrictive. That is, read-only over-rides read/write and no access over-rides both read-only and read/write.

For example, assume the softkeys under CONFIG have these access definitions: POSITION and CIRCUIT have read/write access, CONNECT has read-only access and SYNCH has no access.

**Case 1**: If CONFIG has read/write access (the least restrictive definition), the access definitions of the four softkeys POSITION, CIRCUIT, CONNECT and SYNCH are in effect.

**Case 2**: If CONFIG is defined as read-only access (more restrictive), it overrides the definitions for POSITION and CIRCUIT. Then POSITION, CIRCUIT and CONNECT have read-only access and SYNCH has no access.

Case 3: If CONFIG is defined as no access (the most restrictive definition), it over-rides the definitions for POSITION, CIRCUIT and CONNECT and all four softkeys have no access.

The data area shows the access defined for a softkey; it does not indicate if it is over-ridden by a more restrictive definition on another softkey (see Figure B3-1).

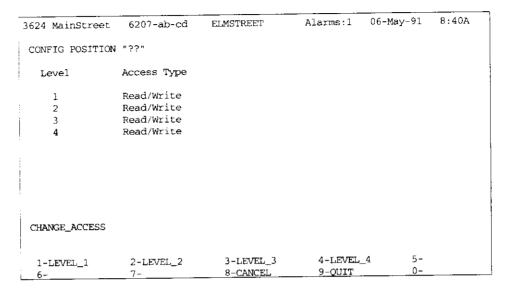


Figure B3-1: NMTI Screen Showing Access Level Definition

# To define access levels 4 through 1

We recommend you complete the Access Level Settings form in the Node Configuration Forms manual. This form facilitates configuration and provides a permanent record of your defined access levels.

1. Select the softkey that represents the point at which you want to change a particular level's access.

For example, to define the access to module positions, select CONFIG then POSITION.



NOTE: Step 2 works only for users logged on as level 5 users.

#### 2. Press:

<Escape> <A>

The softkey being defined appears in the top left corner of the data area (e.g., CONFIG POSITION "??" in Figure B3-1). If you are defining a MORE softkey, the word MORE does not appear in the top left corner, (e.g., when ALARMS MORE is being defined only the word ALARMS appears).

3. Select the user level you wish to define:

LEVEL\_1 or LEVEL\_2 or LEVEL\_3 or LEVEL\_4

The softkey that does not appear is already selected.

4. Select the access definition for this softkey:

READ/WRITE or READ\_ONLY or NO\_ACCESS

The softkey that does not appear is already selected.

#### **B3.4** Passwords

The default password for all levels is "MAINSTREET" but the password for all levels can be changed. Passwords must be between 8 and 12 alphanumeric characters long with no spaces.

When the system is first commissioned, it is a good idea to change the passwords to protect the node database from unauthorized users. Only level 5 users can change passwords (the CHNG\_PSSWD softkey does not appear for users logged on at other levels).

### To change passwords

1. Enter:

HOUSE MORE CHNG\_PSSWD

You are prompted for the level 5 password.

2. Enter the level 5 password:

<password> <Return>

Softkeys for levels 1 through 5 appear.

3. Select the level for which you wish to change the password:

LEVEL\_1 or LEVEL\_2 or LEVEL\_3 or LEVEL\_4 or LEVEL\_5

The softkey that does not appear is already selected.

The system prompts you for the new password. Passwords can be between 8 and 12 alphanumeric characters long (no spaces).

**4.** Enter the new password:

<new password> <Return>

The password is not echoed on the screen. If you make a typing error, select CANCEL and retype the whole word.

5. Select:

**PROCEED** 

The system requests verification of the password.

6. Enter the new password again:

<password> <Return>

7. Select:

**PROCEED** 

The password is entered into the database in encrypted form.

# C. Module and Circuit Configuration

### C1. Module Position Configuration

This chapter describes the configuration of modules, including:

- module position identifiers
- configuring module positions for installed modules
- displaying the status of module positions
- naming a module position

### C1.1 Module Position Identifiers

Many activities, controlled by the NMTI, are performed on specific module positions. The three types of modules, each with its own set of identifiers are:

- primary rate link module
- resource modules
- ☐ interface modules

The interface module positions on both Universal Interface cards and the LGS Interface card are numbered "1" through "12".

Figure C1-1 shows the module position numbering.

The module positions are identified using a combination of letters and/or numbers. Table C1-1 lists the identifiers that you enter from the keyboard when the NMTI prompts you. These identifiers are used in the procedures for the configuration of module positions.

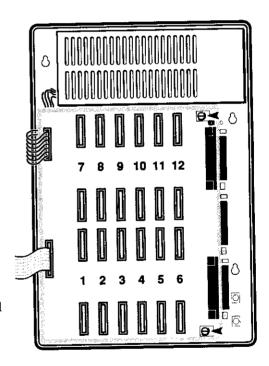


Figure C1-1: Interface Module
Position Numbering

**Table C1-1: Module Position Identifiers** 

Module	Identifier	Range	Examples
Primary Rate Link	<t1></t1>		<t1></t1>
DDS	<dsp></dsp>	_	<dsp></dsp>
Tone	<dsp></dsp>	_	<dsp></dsp>
Interface modules	<##>	pp = 1 to 12	<4>

### C1.2 Displaying Module Positions

The NMTI can display information about all the module positions.

To display all module positions

1. Enter

CONFIG SHOW\_ALL

OF

CONFIG POSITION < Escape > SHOW\_ALL

A screen similar to Figure C1-2 appears.

3624	MainStreet	6207-ab-cd	ELMSTREET	Alan	ns:3 06-	May-91 9:37A
#	Configured	Installed	Status	Name	Options	
M01	E+M	E+M	Ok	E&M	0157-03	2-WIRE
M02	LGS	LGS	Ok	LGS	0156-06	. ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
м03	LGE	LGE	Ok	LGE	0526-01	
M04	OCU	ocu	0k	OCU	0693-02	
M05	RS232_DCM	RS232_DCM	Ok	RS-232		
M06	Empty	Empty	Empty			
M07	Empty	Empty	Empty			
80M	Empty	Empty	Empty			
M09	Empty	Empty	Empty			
M10	Empty	Empty	Empty			
M11	Empty	Empty	Empty			
	Empty	Empty	Empty			
r1	T1	T1	OOS	PRIME	.TB7 D4 N	o Interface
OSP	DDS	DDS	Ok	11(11)	05/ 54 1	o incertace
CONF	TG.					
20111						
1-P	OSITION	2-CIRCUIT	3-CONNECT	4-9	YNCH	5-
6-S	HOW_ALL	7-	8-CANCEL	9-0		0-

Figure C1-2: Sample Display of All Module Positions
The information displayed in the module positions columns is explained in Table C1-2.

Table C1-2: Screen Display Column Entries

Column	Heading	Description
#		The module position number
Configured	d	The type of module for which the position is configured
Installed		The type of module actually installed in that position
Status:	Empty Ok Wrong Module Fault On Module Bad Module ID	No module is installed in the position The module installed matches the type configured for the position The module installed does not match the type configured for the position There is something wrong with the module The module identification is not recognized by the software
Name		The name that has been assigned to the module position
Options		Options that have been selected for the module position

### C1.3 Configuring a Resource Module Position

Resource modules are optional and only one can be installed on the Control card at one time. The resource modules are:

- ☐ the Dataphone Digital Service (DDS) module
- ☐ the Tone module

You must configure a resource module position to accept the type of module installed before you configure or cross-connect circuits on that module. Once a module position is configured, the circuits on the module are automatically configured with default settings and can be cross-connected.

The T1 module position does not have to be configured.

#### To configure a Resource module

1. Enter:

CONFIG POSITION <DSP> <Return> TYPE

2. Select:

DDS or TONE\_GEN

### C1.4 Configuring an Interface Module Position

You must configure an Interface module position to accept the type of module installed before you configure or cross-connect module circuits on that module. Once a module position is configured, the circuits are automatically configured with default settings. The circuits can be cross-connected.

The default variant for each module type is listed in Table C1-3.

Table C1-3: Defaults for Module Types

Module type	Default
LGS	0156-06
LGE	0526-01
E&M	0157-03 2-wire
œυ	0693-02
DNIC	none
X.21 DCM	none
V.35 DCM	none
RS-232 DCM	попе
MRD	none
4W TO	none



NOTE: The number of each module option forms the part number along with "90-" prefix. Each part number is found on the plastic identification tab of the physical module.

# To specify an LGS module

1. Enter:

CONFIG POSITION *<pp>* <Return> TYPE VOICE LGS where *pp* is the module position number from 1 to 12 Once the LGS module is selected, the OPTIONS softkey appears.

2. To select the LGS variant, enter:

OPTIONS 0156-02 or 0156-03 or 0156-06 or 0156-07 or 0156-08

The softkey that does not appear is already selected.

Figure C1-3 illustrates the information that is displayed on the NMTI screen when the LGS variant number is entered.

3624	Mains	Street	6207-ab-	-cd	LONERAN	SER	Alarms:3	25-Apr-91	6:46P
#	Conf	igured	Installe	ed Sta	atus	Name	Options		
м03	LGS		LGS	Em	oty		0156-06		
015 015 015	6-02 6-03 6-06	RX TLP 0/-7 0/-7 -3/-10 -3/-10	+4/-3 +4/-3	IMPEDANO 600 600 600 600 600+2	no ye no ye	s M	PCM fulaw fulaw fulaw fulaw fulaw		
CON	FIG P	OSITION	3 OPTION	S					
1- 6-	0156-	02	2-0156- 7-	03	3- 8-CANCEL		4-0156-07 9- <u>OUIT</u>	5-0156 <u>0</u> -	-08

Figure C1-3: Display for Interface Module LGS Variants

# To specify an LGE module

#### 1. Enter:

CONFIG POSITION <pp> <Return> TYPE VOICE LGE

where pp is the module position number from 1 to 12

Once the LGE module is selected, the OPTIONS softkey appears.

2. To select the LGE variant, enter:

OPTIONS 0526-01 or 0526-03

The softkey that does not appear is already selected.

Figure C1-4 illustrates the information that is displayed on the NMTI screen when the LGE variant number is entered.

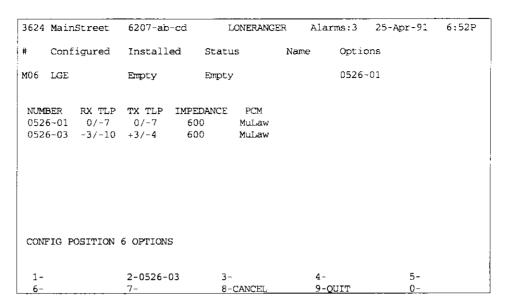


Figure C1-4: Display for Interface Module LGE Variants

### To specify an E&M module

#### 1. Enter:

CONFIG POSITION <pp> <Return> OPTIONS VOICE E&M where pp is the module position number from 1 to 12
Once the E&M module is selected, the OPTIONS softkey appears.

2. To select the E&M variant, enter:

0157-01 or 0157-03

The softkey that does not appear is already selected.

Figure C1-5 illustrates the information that is displayed on the NMTI screen when the E&M variant number is entered.

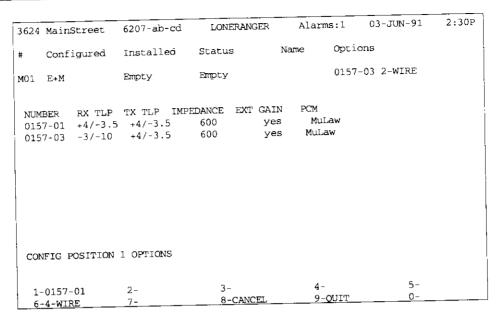


Figure C1-5: Display for Interface Module E&M Variants

Both E&M variants support 2-wire and 4-wire operation which is described in Chapter E3, E&M Modules, in this manual.

## To specify an MRD module

#### 1. Enter:

CONFIG POSITION  $\langle pp \rangle$  <Return> OPTIONS VOICE MRD where pp is the module position number from 1 to 12

The MRD module does not have option softkeys at the module level.

# To specify an OCU module

#### 1. Enter:

CONFIG POSITION <pp> <Return> TYPE DATA OCU

where pp is the module position number from 1 to 12

Once the OCU module is selected, the OPTIONS softkey appears.

To select the OCU variant, enter:

OPTIONS 0693-01 or 0693-02

The softkey that does not appear is already selected.

Figure C1-6 illustrates the information that is displayed on the NMTI screen when the OCU variant number is entered.

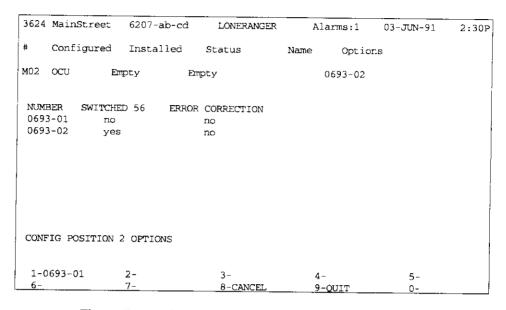


Figure C1-6: Display for Interface Module OCU Variants

### To specify an RS-232 DCM

#### 1. Enter:

CONFIG POSITION <pp> <Return> TYPE DATA RS232\_DCM where pp is the module position number from 1 to 12
The RS-232 DCM does not have option softkeys at the module level.

### To specify a DNIC module

#### 1. Enter:

CONFIG POSITION *<pp>* <Return> TYPE DATA DNIC where *pp* is the module position number from 1 to 12
The DNIC module does not have option softkeys at the module level.

### To specify an X.21 DCM

#### 1. Enter:

CONFIG POSITION <pp> <Return> TYPE DATA X.21\_DCM where pp is the module position number from 1 to 12



NOTE: X.21 DCMs can be installed in any module position for sub-rate interface speeds. But the modules positions chosen for super-rate interface speeds are determined by the data rate of the super-rate circuits. See section F3.11, "Super-rate Circuits", for more information.

The X.21 DCM does not have option softkeys at the module level.

## To specify a V.35 DCM

#### 1. Enter:

CONFIG POSITION  $< pp > < Return > TYPE DATA V.35_DCM$  where pp is the module position number from 1 to 12



NOTE: V.35 DCMs can be installed in any module position for sub-rate interface speeds. But the modules positions chosen for super-rate interface speeds are determined by the data rate of the super-rate circuits. See section F3.11, "Super-rate Circuits", for more information.

The V.35 DCM does not have option softkeys at the module level.

## To specify a 4W TO module

#### 1. Enter:

CONFIG POSITION <pp> <Return> TYPE DATA 4W-TO
where pp is the module position number from 1 to 12
The 4W TO module does not have option softkeys at the module level.

# To specify no module

You can specify a module position with no module installed as "empty".

#### 1. Select:

CONFIG POSITION  $\langle pp \rangle$  <Return> TYPE EMPTY where pp is the module position number from 1 to 12

# To specify as present

You can specify a module position for a module that is physically installed on the Interface card. The module is set with its default values.

#### 1. Enter:

CONFIG POSITION <pp> <Return> TYPE AS\_PRESENT

where pp is the module position number from 1 to 12



NOTE: For module positions '1' through '12', once the module type and correct options are designated, the module status LED on the module comes on. If it does not, make sure the module is properly installed. If the LED still does not come on, you may have a faulty module. Check the alarm queue (see Chapter 2, Alarms, in the Maintenance manual).

### C1.5 Quick Module Position Configuration

Rather than configure each module position separately, you can configure several positions at once. Module positions are configured to match the module type installed and are assigned their default configuration settings.

Module positions are not affected if:

- the module positions are correctly configured for the module type installed
- the empty module positions are configured for a module type

To specify all module positions at one time

I. Select

CONFIG POSITION < Escape > CONFIG ALL

### C1.6 Naming a Module Position

Each module position can be assigned a unique name. For example you could assign the first occurring LGS module as "LGS1", or a module dedicated to the payroll department as "PAYROLL". Each name can be up to 8 alphanumeric characters long, with no spaces.

# To name a module position

1. Enter

CONFIG POSITION <pp> <Return> NAME

The NMTI prompts you for a name. A name can be up to 8 alphanumeric characters long (no spaces).

2a. To assign a name, enter:

<name> <Return>

2b. To delete a name without assigning another, enter:

<Return>

# C2. Circuit Numbering, Naming and Quick Configuration

This chapter describes the configuration of circuits, including:

circuit numbering
naming circuits
copying circuit configurations

### C2.1 Circuit Numbering

When you configure the 3624 MainStreet, the NMTI frequently prompts you to enter a circuit identifier. Circuits are identified by a combination of letters and/or numbers. The four types of circuit, each with its own set of circuit identifiers, are:

☐ T1 circuits
☐ voice circuits
☐ data circuits
☐ DNIC circuits

T1 circuits

The T1 circuits are numbered "T1-1" through "T1-24".

Voice circuits

Voice modules each have two circuits, numbered 1 and 2.

Data circuits (except DNIC)

RS-232 DCMs and OCU modules each have two circuits, numbered 1 and 2. X.21 and V.35 DCMs each have one circuit, numbered 1.

**DNIC** circuits

DNIC modules each have two circuits. DNIC circuits are numbered A and B. A or B corresponds to the port of the 2600-series *MainStreet* Data Termination Unit (DTU) to which the data device is connected.

Table C2-1 lists the identifiers that you enter from the keyboard when the NMTI prompts you. These identifiers are used in the procedures for configuring the voice and data circuit operating parameters.

Table C2-1: Circuit Identifiers

Circuit	Format	Range	Examples
Primary rate circuits	<t1-cc></t1-cc>	cc = 1 to 24	<t1-22></t1-22>
Interface module circuits:	_	_	_
LGS, LGE, MRD, E&M, 4W TO	<pp-c></pp-c>	pp = 1  to  12, c = 1  or  2	<12-2>
DNIC	<pp-c></pp-c>	pp = 1  to  12, c = A  or  B	<6-A>
RS-232 DCM, OCU	<pp-c></pp-c>	pp = 1  to  12, c = 1  or  2	<10-1>
X.21 DCM, V.35 DCM	<pp-c></pp-c>	pp = 1  to  12, c = 1	<3-1>

#### C2.2 Circuit Names

You can assign any circuit an unique name, which is displayed in the data area whenever the circuit configuration is viewed. A name can be up to 8 alphanumeric characters long (no spaces).

#### To name circuits 1. Enter:

CONFIG CIRCUIT <T1-cc> or <pp-c> <Return> NAME

The NMTI prompts you for a name. A name can be up to 8 alphanumeric characters long (no spaces).

2a. To assign a name, enter:

<name> <Return>

**2b.** To delete a name without assigning another, enter:

<Return>

### C2.3 Quick Circuit Configuration

Rather than configure each circuit separately, you can configure several circuits of the same type at once.

# To copy circuit configuration

You can assign the same configuration to another circuit or to many circuits of the **same type**. The first circuit is configured and its parameters (all but name and connection) are copied to the other circuits. Individual circuit configuration is described in Volume E, Voice Modules, and Volume F, Data Modules, in this manual.

1. Enter:

CONFIG CIRCUIT <T1-cc> or <pp-c> <Return> COPY\_TO

The NMTI prompts you to enter the circuit to which you wish to copy the configuration.

2a. To copy the configuration to same type of circuit enter:

<T1-cc> or <pp-c> <Return>

2b. To copy the configuration to all circuits, enter:

<Escape> ALL

## To copy and adjust

į,

You can also copy the configuration of one circuit to another circuit of the **same type** and automatically adjust the data position of the second circuit to follow the data of the first circuit. This is used only for data circuits using transparent, HCM, or DDS rate adaption. Its exact use varies in each case. Do not use this feature when configuring a multi-drop data bridge.

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> COPY\_ADJ

The NMTI prompts you to enter the circuit to which you wish to copy and adjust the data position.

2. Enter:

<pp-c> <Return>

# C3. Cross-connecting Circuits

This chapter provides an overview of the basic circuit cross-connection that applies to many different situations, including:

- connecting circuits
- disconnecting circuits
- displaying circuit cross-connections

### C3.1 Simple Cross-connections

Module positions must be configured before circuits can be cross-connected. The circuits on the configured module position are then automatically configured with default settings and can be cross-connected. Each circuit on a voice or data module can be cross-connected to a 64 kb/s channel on the T1 line (a T1 circuit).

If you try to modify or cross-connect circuits on an unconfigured module, the NMTI displays the error message, "Invalid circuit number".

Circuits can be cross-connected one at a time or all at one time.

### To cross-connect 1. circuits

Enter:

CONFIG CONNECT <T1-cc> or <pp-c> <Return>

2. Select:

TO\_CIRCUIT

If the first circuit is already connected, a warning to that effect appears but you can proceed.

The NMTI prompts you for the circuit identifier of the circuit to which you want to connect.

3. Enter:

<pp-c> or <T1-cc> <Return>

After you enter the second circuit identifier, you are warned if that circuit is already connected. If you proceed, the existing connection for the specified circuit is broken and the new connection is made.

If you are cross-connecting a T1 circuit, you can enter <CPSS> as the second circuit identifier. This designates the 64 kb/s T1 channel as a carrier of Control Packet Switching System (CPSS) messages. CPSS messages can also be carried on the Facility Data Link as described in the Chapter I1, Configuration for Network Management, in this manual.

We recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.

#### C3.2 Quick Circuit Cross-connection

Rather than cross-connect circuits one by one, you can connect all unconnected T1 circuits to unconnected voice and data circuits in a single operation.



NOTE: Quick circuit connection has no effect on circuits already connected.

Unconnected circuits are cross-connected in sequence. For example, if no circuits are currently connected, the cross-connections as shown in Table C3-1 are made.

Table C3-1: Automatic Circuit Cross-Connections

Circuit	Connected to Circuit
T1-1	M1-1
T1-2	M1-2
T1-3	M2-1
T1-4	M2-2
T1-5	M3-1
etc.	etc.
T1-23	M12-1
T1-24	M12-2

To connect all unconnected circuits

#### 1. Enter:

CONFIG CONNECT < Escape > ALL

The NMTI data area displays the number of new connections.

### C3.3 Disconnecting Circuits

Circuits can be disconnected one at a time or all at one time.

### To disconnect a circuit

1. Enter:

CONFIG CONNECT

The NMTI prompts you to enter the identity of the circuit to be disconnected.

2. Enter:

<T1-cc> or <pp-c> <Return>

The data area displays the current cross-connection of the circuits.

3. Select:

DISCONNECT



NOTE: The DISCONNECT softkey appears only when the first circuit is cross-connected to another circuit. Selecting DISCONNECT breaks the existing connection without defining another one.

### To disconnect all 1. circuits

Enter:

CONFIG CONNECT < Escape > DISCON\_ALL

The DISCON\_ALL softkey appears only if at least one circuit is cross-connected.

All circuits on all modules are disconnected.

### C3.4 Displaying Cross-connected Circuits

You can display circuit cross-connections:

- for a group of circuits (SHOW\_GROUP)

Default: display of cross-connection of one circuit (SHOW\_CCT)

For circuits on voice and data modules, NMTI displays both circuits for modules with two circuits and one circuit for modules with one circuit. For T1 circuits, information on the specified circuit and its eleven adjacent circuits is displayed. The connected circuits are marked with an asterisk.

## To display cross- 1. connections

1. Enter:

CONFIG CONNECT <T1-cc> or <pp-c> <Return>

The NMTI displays the current operating parameters of the circuit.

2. Select:

SHOW\_CCT or SHOW\_GROUP

The SHOW\_CCT/SHOW\_GROUP softkey is a toggle softkey; the softkey that does not appear is already selected.

# D. Primary Rate Link Configuration

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### D1. T1 Module Operating **Parameters**

This chapter describes the operating parameters for the primary rate link, including:

- zero-code suppression handling
- line length and line build-out
- framing format
- ב naming the link

We recommend that you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.

#### T1 Zero Code Suppression D1.1

Zero code suppression provides sufficient pulse (ones) density to ensure that line synchronization is maintained. The output data stream must never include more than 15 consecutive zeros.

The types of zero code suppression available are:

- transparent (TRANSP) J
- binary 8-zero suppression (B8ZS)
- jam bit 7 (JB7)

Default: jam bit 7 (JB7)

#### Transparent

The 3624 performs no zero code suppression. The data of the user must use a protocol designed to ensure a sufficient ones density pattern, to avoid line synchronization problems.

#### Binary 8-zero suppression

Binary 8-zero suppression replaces eight consecutive zeros with a known pattern of ones with bipolar violations to ensure a minimum one-in-eight ones density. Binary 8-zero suppression must be selected if 64 kb/s clear data channels (that is, channels for which signalling is not passed) are required. Binary 8-zero suppression ensures integrity of the data. Binary 8-zero suppression must also be selected at the network's far end.

#### Jam bit 7

Jam bit 7 changes bit 7 (the next-to-least significant bit) to a "1" if all eight bits of the word are "0". Jam bit 7 reduces the usable channel bandwidth to 56 kb/s. (See Figure D1-1.) Jam bit 7 must also be selected at the network's far end.

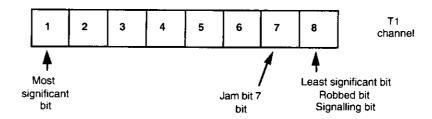


Figure D1-1: Jam Bit 7 Position

To configure zero code suppression

1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS ZERO SUPPR

2. Select:

TRANSP or B8ZS or JB7

The softkey that does not appear is already selected.



NOTE: If B8ZS or JB7 is selected, the same type of zero code suppression must also be selected at the network's far end.

### D1.2 Line Length and Line Build-out

#### Line length

For systems with a LIM or DSX-1 module on the Control card, the line length must be specified. The line length is the distance between the 3624 and the external Channel Service Unit (CSU) or digital cross-connect point.

The three distance ranges available are:

- 0 to 150 ft (0\_150FT)
- 151 to 450 ft (151\_450Ft)
- **□** 451 to 655 ft (451\_655Ft)

Default: 0 to 150 ft (0\_150FT)

If the LIM or DSX-1 module is not yet installed the fe	ollowing softkeys
appear:	

- ☐ SHORT in place of 0\_150FT
- ☐ MEDIUM in place of 151\_450Ft
- LONG in place 451\_655Ft

# To set the line length

1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS LINE\_LNGTH

2. Select the range:

0\_150FT or 151\_450Ft or 451\_655Ft

The softkey that does not appear is already selected.

#### Line Build-out

For systems with a CSU module on the Control card, the Line Build-out (LBO) must be set. The LINE\_LNGTH softkey is labelled LBO.

The three ranges available are:

- □ 0 dB (0dB)
- □ 7.5 dB (7.5dB)
- ☐ 15 dB (15dB)

Default: 0 dB (0dB)

If the CSU module is not yet installed the following softkeys appear:

- ☐ SHORT in place of 15dB
- ☐ MEDIUM in place of 7.5dB
- LONG in place 0dB

#### To set the LBO

1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS

2. Select:

0dB or 7.5dB or 15dB

The softkey that does not appear is already selected.



NOTE: This procedure does not work if the CSU module has a mechanical slide switch for setting the LBO. See section 5.5, "Setting the Line Buildout", in Chapter 5, The Control Card Modules, in the Installation manual.

### D1.3 T1 Framing

Two types of T1 framing are available:

- ☐ D4 framing format (D4\_FRAMING)
- → extended superframe format (ESF)

Default: D4 framing format (D4\_FRAMING)

D4 is a framing pattern on a T1 link. A D4 frame consists of 193 bits: 24 timeslots each containing 8 bits plus one framing bit.

Extended superframe format (ESF) framing creates superframes consisting of 24 D4 frames.

ESF must be selected if the Facility Data Link (FDL) is used. If the FDL is cross-connected, the D4\_FRAMING softkey does not appear. FDL is a 4 kb/s channel available on the T1 link when ESF framing is used.

# To configure T1 framing

1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS

2. Select:

D4\_FRAMING or ESF

The softkey that does not appear is already selected.

### D1.4 Naming the Primary Rate Link

You can give the primary rate link a unique name using up to 8 alphanumeric characters with no spaces.

To name the link 1. Enter:

CONFIG POSITION <T1> <Return>

2. Enter:

NAME

The system prompts you for a name.

3. Enter:

<name> <Return>

# D2. T1 Circuit Operating Parameters

This chapter describes configuration of the 64 kb/s channels within the T1 link, referred to as T1 circuits. In particular, it includes:

ū	turning	robbe	ed b	it signa	lling on	and	off
		_					٠.

- inverting the data bits on a T1 circuit
- specifying the signalling type
- specifying the fault signalling for a T1 circuit

We recommend that you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.

### D2.1 Robbed Bit Signalling

When robbed bit signalling is enabled, the least significant bit (bit position 8) of every channel in frames 6 and 12 (if D4 framing is used) or frames 6, 12, 18 and 24 (if ESF framing is used) is overwritten with signalling information.

If a DCM or DNIC circuit with a bandwidth of 64 kb/s or greater is connected to a T1 circuit, robbed bit signalling must be disabled (for the T1 circuit).

Robbed bit signalling can be:

- enabled (RBS\_ON)
- disabled (RBS\_OFF)

Default: enabled (RBS\_ON)

The robbed bit signalling default configuration for the T1 circuit automatically changes when it is cross-connected to the circuit type as shown in Table D2-1.

Table D2-1: Robbed Bit Signalling and Circuit Cross-connections

Circuit Type	RBS after Cross-connection
DNIC/DCM/OCU	OFF
OCU with SW56	ON
CPSS	OFF



NOTE: The FUNCTION softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

# To set robbed bit 1. signalling

1. Enter:

CONFIG CIRCUIT <T1-cc> <Return> FUNCTION

2. Select:

RBS\_ON or RBS\_OFF

The softkey that does not appear is already selected.

#### D2.2 Data Bit Inversion

If a T1 circuit is connected to a voice or data circuit, the 3624 automatically matches data bit inversion to the type of circuit connected. Data bit inversion only needs to be changed where there is a requirement to convert between the CCITT alternate digit inversion PCM output code format and the AT&T truesign inverted magnitude PCM output code format. You can invert the digital signals on the T1 trunk on a per circuit basis.

The two options are:

- voice (VOICE)
- data (DATA)

Default: voice (VOICE)

The data inversion default configuration for the T1 circuit automatically changes when it is cross-connected to the circuit type as shown in Table D2-2.

Table D2-2: Data Inversion and Circuit Cross-connections

Circuit Type	Data Inversion after Cross-connection
DNIC/DCM/OCU	DATA
CPSS	DATA
Voice Circuit	VOICE

If voice is selected, "0" bits are sent as "1" bits and vice versa. If data is selected, the bits are not inverted ("0" bits are sent as "0" bits and "1" bits as "1" bits). Select VOICE if you expect your circuit traffic to include a lot of zeros.

For bypass connections, the default for both circuits after the connection is made, is DATA. If the remote circuits are in fact voice circuits, change this parameter after the connection is made.

### To select data inversion

1. Enter:

CONFIG CIRCUIT <T1-cc> <Return> FUNCTION

2. Select:

**VOICE or DATA** 

### D2.3 Signalling Type

The two signalling choices are:

- signalling on (SIG)
- ☐ signalling off (NoSIG)

Default: signalling on (SIG)

If you wish to create a clear 64 kb/s channel (that is, a channel for which signalling is not passed), select NoSIG and turn off robbed bit signalling for a T1 circuit.



NOTE: The signalling types represented by SIG and NoSIG softkeys, are used only in T1 to T1 connections. The signalling type is automatically changed to match the circuit type when a cross-connection is made.

## To configure the 1. signalling type

1. Enter:

CONFIG CIRCUIT <T1-cc> MORE SIG\_TYPE

2. Select:

SIG or NoSIG

The softkey that does not appear is already selected.

### D2.4 T1 Fault Signalling

Fault signalling specifies the signalling the 3624 applies to a circuit if the interface to which it is cross-connected is not available (that is, not physically present or out of synchronization).

The options are:

- → seized (SEIZED)
- idle (IDLE)
- ☐ no trunk conditioning (NONE)

Default: idle (IDLE)



NOTE: The NONE softkey is described in section D3.2, "Types of Trunk Conditioning".

# To configure fault signalling

1. Enter:

CONFIG CIRCUIT <T1-cc> <Return> FAULT\_SIG

2. Select:

SEIZED or IDLE

The softkey that does not appear is already selected.

# D3. Trunk Conditioning

This	chapter describes trunk conditioning, including:
i i	one-way and two-way trunk conditioning selecting the type of trunk conditioning enabling and disabling trunk conditioning

configuration of the alarm declaration and clearing times

We recommend that you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.

### D3.1 Overview of Trunk Conditioning

Both voice and data calls consist of an information component and a signalling component. Trunk conditioning defines the type of signal transmitted on both the information path and the signalling path when a fault occurs on the T1 trunk. You can define trunk conditioning for all outgoing transmissions.

Trunk conditioning can be configured as one-way or two-way. It can also be enabled or disabled for various classes of link faults. Trunk conditioning can be turned off for individual T1 circuits. You can specify how long a fault must persist before an alarm is raised and how long a fault must be cleared before the alarm is cleared.

You can change the trunk conditioning at any time. However, any change results in service disruption. If any circuits on the link are cross-connected when the trunk conditioning attributes are being changed, the warning message "WARNING: Pressing PROCEED will result in a disruption of service", is displayed on the diagnostics line.

### D3.2 Types of Trunk Conditioning

The two types of trunk conditioning are:

☐ one-way trunk conditioning (ONE\_WAY)

two-way trunk conditioning (TWO\_WAY)

Default: two-way trunk conditioning (TWO\_WAY)



NOTE: Primary rate circuits configured to carry Control Packet Switching System (CPSS) messages have two-way trunk conditioning applied regardless of the type of trunk conditioning selected.

# One-way trunk conditioning

If a link is configured for one-way trunk conditioning, the information path and/or the signalling path (depending on the fault) are broken in the direction of the fault only.

The 3624 MainStreet continues to transmit the signalling. On the information path, the 3624 MainStreet transmits all 0s (see Figure D3-1). Transmission in the other direction is not affected.

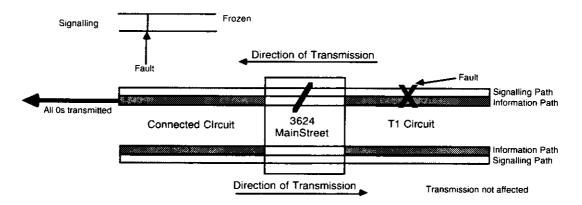


Figure D3-1: One-way Trunk Conditioning

Implementing one-way trunk conditioning

The implementation of one-way trunk conditioning is dependent on the type of alarm raised by the T1 link fault.

Red, Framing Err Rate Exceeded and Failed State Alarms: One-way trunk conditioning is implemented.

**Yellow Alarm:** When a Yellow Alarm occurs, the information and signalling paths are not broken in either direction. No action is necessary since the fault lies in the transmit path of the T1 circuit (with respect to the *3624*), not its receive path.

**CSU Loopback Activated Alarm,:** When a CSU Loopback Activated Alarm occurs, the *3624* performs two-way trunk conditioning regardless of whether ONE\_WAY or TWO\_WAY is selected.

## Two-way trunk conditioning

If the link is configured for two-way trunk conditioning the information path and the signalling path are broken in both directions when a fault occurs (see Figure D3-2).

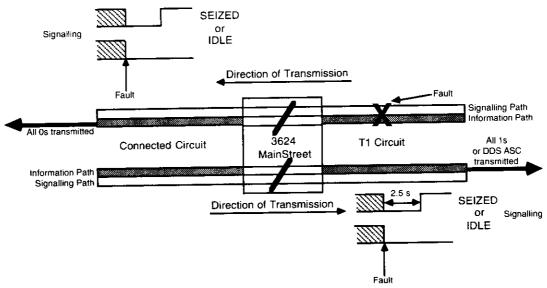


Figure D3-2: Two-way Trunk Conditioning

On the signalling path, both the T1 circuit and the connected circuit undergo fault signalling. For the T1 circuit, the signalling is driven to idle for 2.5 seconds, then to seized or idle depending on how it is configured (see Chapter D2, T1 Circuit Operating Parameters, in this manual). For the connected circuit, the signalling is driven to idle, then to seized or idle depending on how it is configured.

On the information path, both the T1 circuit and the connected circuit undergo fault signalling. For the T1 circuit, the 3624 MainStreet transmits all ones if the circuit is not using DDS rate adaption and a DDS Abnormal Station Code (ASC) if it is. For the connected circuit's information path, the 3624 MainStreet transmits all 0s.

The implementation of two-way trunk conditioning is independent of the type of alarm raised by the link fault.

**Example:** For example, if a T1 circuit is connected to an E&M circuit and a fault occurs on the T1 link, the voice path is broken in both directions. On the voice path of the T1 circuit, the 3624 MainStreet transmits all 1s. On the signalling path of the T1 circuit, the 3624 MainStreet transmits the fault signalling as configured for the T1 link.

On the E&M circuit's voice path, the 3624 MainStreet transmits all 0s. On the E&M circuit's signalling path, the 3624 MainStreet transmits the fault signalling as configured for the circuit.



NOTE: A T1 circuit configured to carry Control Packet Switching System (CPSS) messages under CONFIG CONNECT has two-way trunk conditioning applied regardless of the type of trunk conditioning selected.

# To configure the 1. type of trunk conditioning

#### Enter:

CONFIG POSITION <T1> <Return> OPTIONS MORE TRUNK\_COND

#### 2. Select:

ONE\_WAY or TWO\_WAY

The softkey that does not appear is already selected.

This enables trunk conditioning for T1 link faults. You can select classes of alarms that cause trunk conditioning to be applied. See section D3.3, "Enabling and Disabling Trunk Conditioning", in this chapter.

# To disable trunk conditioning for a T1 circuit

If you turn trunk conditioning off for any T1 circuit, no trunk conditioning is applied to that circuit regardless of how the link is configured for trunk conditioning. That is, the circuit connected to the link stays connected during any red or yellow alarms.

#### 1. Enter:

CONFIG CIRCUIT <T1-cc> <Return> FAULT\_SIG NONE

### D3.3 Enabling and Disabling Trunk Conditioning

Trunk conditioning can be enabled or disabled for various classes of T1 link faults. If trunk conditioning is enabled (\_ON) for a fault class, one- or two-way trunk conditioning is applied (as configured) when an alarm in that class is raised. If trunk conditioning is disabled (\_OFF) for a fault class, the system performs no trunk conditioning when an alarm in that class is raised.

The five configurable alarm classes are:

- ☐ Red (RED\_OFF/RED\_ON)
- ☐ Yellow (YELLOW\_OFF/YELLOW\_ON)
- ☐ Failed State (FAILED\_OFF/FAILED\_ON)
- ☐ Framing Error Rate Exceeded (ERROR\_OFF/ERROR\_ON)
- ☐ CSU Loopback Activated (CSU\_LP\_OFF/CSU\_LP\_ON)

Default: all five are enabled (\_ON)

Table D3-1 lists the occurrence and the clearing of each alarm class.

Table D3-1: Occurrence and Clearing of Alarms

Alarm Class	Occurs When	Clears When	
Red	The frame alignment is lost on the T1 link	The frame alignment is regained	
Yellow	The equipment at the far end of the T1 link has lost frame alignment or it has declared another alarm associated with the link, such as a Framing Err Rate Exceeded alarm	The remote equipment is no longer transmitting the alarm	
Failed State	10 severely errored seconds occur in a row	10 non-severely errored seconds occur in a row	
Framing Err Rate Exceeded	The terminal framing bit (Ft) error rate exceeds approximately 10 <sup>-3</sup> for a period of 4 to 6 seconds	The Ft error rate is below approximately 10 <sup>-4</sup> for 9 to 11 seconds	
CSU Loopback Activated	A CSU loopback is activated on the T1 link	The CSU loopback is removed	

### To configure fault classes

#### 1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS MORE TRUNK\_COND

The softkeys with '\_OFF' disable trunk conditioning for the fault class. The softkeys with '\_ON' enable one- or two-way trunk conditioning for the fault class.

#### 2. Select:

RED\_OFF or RED\_ON YELLOW\_OFF or YELLOW\_ON FAILED\_OFF or FAILED\_ON ERROR\_OFF or ERROR\_ON CSU\_LP\_OFF or CSU\_LP\_ON

The softkey that does not appear is already selected.

#### D3.4 Alarm Declaration Time

The alarm declaration time determines how long a fault must persist before an alarm is declared. Configure a longer alarm declare time when no alternate route is available or when the T1 link is subject to frequent short outages. Configure a shorter alarm declare time when an alternate path exists so the length of time service is disrupted is minimized.

Both ends of a primary rate link should use the same alarm declare and clear times since both ends of the link should initiate and terminate trunk conditioning at approximately the same time.

The alarm declaration time can be set for alarms in the Red Class. The time is a number from 1 to 300, representing tenths of seconds (0.1 to 30 seconds in 0.1 second steps). For example, for an alarm declaration time of 1.4 seconds, enter 14.

Default: 2.7 seconds (27)

The alarm declaration time is preset to 2.7 seconds for the Yellow Class. The alarm declaration time is not applicable to the other alarm classes.



NOTE: When the alarm declaration time is changed, the change may not take effect immediately.

### To set the alarm declare time

#### 1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS MORE ALARM\_TIME DECLARE

2. Enter:

<time> <Return>

where *time* is a number from 1 to 300, representing tenths of seconds (0.1 to 30 seconds in 0.1 second steps). For example, for an alarm declaration time of 1.4 seconds, enter 14.

### D3.5 Alarm Clearing Time

The alarm clear time determines how long a fault must be cleared before a raised alarm is cleared. Configure a longer alarm clear time when an alternate route exists so connections to the T1 link that declared the fault are not restored until it appears the link is again stable. Configure a shorter alarm clear time when no alternate path exists to minimize the length of time service is disrupted.

Both ends of a primary rate link should use the same alarm declare and clear times since both ends of the link should initiate and terminate trunk conditioning at approximately the same time.

The alarm clearing time can be set for alarms in the Red and Yellow classes; the time set is the same for both classes. The alarm clearing time is not applicable to the other alarm classes.

The time is a number from 1 to 300, representing tenths of seconds (0.1 to 30 seconds in 0.1 second steps). For example, for an alarm declaration time of 19 seconds, enter 190.

Default: 15 seconds (150)



NOTE: When the alarm clearing time is changed, the change may not take effect immediately.

### To set the alarm clear time

1. Enter

CONFIG POSITION <T1> <Return> OPTIONS MORE ALARM\_TIME CLEAR

2. Enter:

<time> <Return>

where *time* is a number from 1 to 300, representing tenths of seconds (0.1 to 30 seconds in 0.1 second steps). For example, for an alarm declaration time of 19 seconds, enter 190.

# D4. Enhanced Alarm Handling

This chapter describes the enhancements to alarm handling on T1 interfaces. It includes:

- a description of yellow alarm support for ESF framing
- selecting the yellow alarm clearing

### D4.1 Yellow Alarm Support for ESF Framing

The 3624 MainStreet supports yellow alarm handling as described in AT&T's Pub 62411 (October, 1988) service requirements. This feature affects T1 connections **only** when the T1 link is configured for ESF framing. Yellow alarm handling with D4 framing complies with Pub 62411.

Software generic release 6107 and 6207, can be configured to operate as per AT&T's Pub 62411 (October, 1985) in order to be compatible with other equipment that supports AT&T's Pub 62411 (October, 1985).

When a 3624 MainStreet, with software generic 6107 and 6207, is connected to another node that supports PUB 62411 (October, 1988) the processing of the yellow alarm for ESF framing occurs as described below.

When a fault condition on the primary rate link causes a Red alarm to be declared at the 3624, the 3624 sends a Yellow alarm to the far end. The far end applies trunk conditioning to its connected circuits (if trunk conditioning has been configured for the connected circuits).

Once the fault condition is corrected and the Red alarm is cleared, the 3624 stops sending the Yellow alarm to the far end. The far end reacts immediately and responds as it did prior to the fault condition. When a 3624 MainStreet, with software generic 6107 and 6207, is connected to another node that supports PUB 62411 (October, 1985) the processing of the yellow alarm for ESF framing occurs as described below.

When a fault condition on the primary rate link causes a Red alarm to be declared at the 3624, the 3624 sends a Yellow alarm to the far end. The far end applies trunk conditioning to its connected circuits (if trunk conditioning has been configured for the connected circuits).

Once the fault condition is corrected and synchronization is regained, but the Red alarm is not cleared, the 3624 immediately stops sending the Yellow alarm to the far end. The far end waits for the alarm clearing time (default: 15 seconds) to elapse and then responds as it did prior to the fault condition.

#### D4.2 Selecting Yellow Alarm Clearing

The YELLOW\_CLR softkey has been added to the ALARM\_TIME menu to allow selection of yellow alarm clearing for generic 6107 and 6207 and for compatibility with equipment supporting PUB 62411 (October, 1985).

The clearing of the yellow alarm can be selected to clear:

	when synchronization is regained (ON_RESYNCH), or
J	when the red alarm is cleared (ON_RED_CLR)

Default: when the red alarm is cleared (ON\_RED\_CLR)

The softkey is always visible on the NMTI screen but it can be activated only when the T1 link is configured for ESF framing. If the link is configured for D4 framing and YELLOW\_CLR is selected, the message: "Warning: YELLOW\_CLR selection applies to ESF mode only", is displayed on the screen.

# To select clearing of the Yellow alarm

1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS MORE ALARM\_TIME YELLOW\_CLR

2a. To set the clearing to occur on resynchronization, select:

ON\_RESYNCH

2b. To set the clearing to occur when the red alarm is cleared, select:

ON\_RED\_CLR

The ON\_RESYNCH/ON\_RED\_CLR softkey is a toggle softkey; the softkey that does not appear is already selected.

### E1. LGS Module

This chapter describes the Loop/Ground Start - Subscriber (LGS) module. It includes:

- a description of the module
- setting the voice circuit operating parameters

#### E1.1 The LGS Module

The LGS module provides an interface to a telephone; it is functionally equivalent to the Foreign Exchange Subscriber (FXS) circuit. The LGS module can be installed on either the Universal Interface card or the LGS Interface card on the 3624.

The module takes two LGS 2-wire analog circuits from the customer premise and passes them on to a primary rate link. The module supports the  $\mu$ -law companding algorithm.

Several variants of the module, that are identified by part number, are available, offering different ranges of transmission level settings and a choice of signalling options.

### **E1.2** About Voice Operating Parameters

When you configure a module position, the circuits on the module in that position are automatically configured with default settings and can be cross-connected. If you try to modify or cross-connect circuits on an unconfigured module position, the NMTI displays an error message.

The configuration parameters for the LGS module are:

- the Transmission Level Points (TLPs)
- the operating mode (signalling type)
- fault signalling

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record your configuration settings.



NOTE: The procedures in this chapter use the FUNCTION softkey. This softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

#### **E1.3** Transmission Level Points

The Transmission Level Point (TLP) specifies the receive and transmit levels (in decibels) of the signal from a voice circuit with respect to the digital trunk. The receive TLP refers to the digital-to-analog level (the difference between **a** and **b** in Figure E1-1) and the transmit TLP refers to the analog-to-digital level (the difference between **d** and **c** in Figure E1-1).

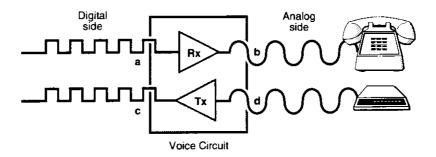


Figure E1-1: TLPs

TLPs use signals measured in dBm, which is the power of a measured signal relative to a reference signal of 1 milliwatt.

A TLP is measured with respect to 0 dBm on the digital side. 0 dBm is equal to 1 mW of power imposed upon an impedance of  $600\Omega$  at a frequency of 1004 Hz. 0 dBm on the digital side is the digital signal required to produce 0 dBm on the analog side of a standard digital-to-analog converter.

For example, a receive TLP of -3 means a digital input of 0 dBm produces an analog output of -3 dBm (see Figure E1-2). The higher the receive TLP, the "louder" the phone conversation sounds.

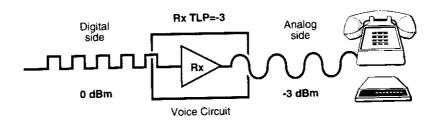


Figure E1-2: An Example of Receive TLPs

A transmit TLP of -3 means an analog signal of -3 dBm is needed to produce 0 dBm on the digital side (see Figure E1-3). The higher the transmit TLP, the "quieter" the phone conversation sounds for a given input signal level.

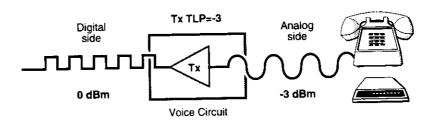


Figure E1-3: An Example of Transmit TLPs

#### **TLP Ranges**

Table E1-1 lists the permissible RX TLP and TX TLP ranges, with the steps, for all LGS voice modules and gives the default settings.

Table E1-1: Permissible TLPs for LGS Module Circuits

LGS Module	TLP Range	Steps	Default
Circuits	(dBm)	(dBm)	(dBm)
LGS	Rx: 0 to -7	1.0	0.0
(0156-02)	Tx: 0 to -7	1.0	0.0
LGS	Rx: 0 to -7	1.0	0.0
(0156-03)	Tx: 0 to -7	1.0	0.0
LGS	Rx: -3 to -10	1.0	-7.0
(0156-06)	Tx: +4 to -3	1.0	0.0
LGS	Rx: -3 to -10	1.0	-7.0
(0156-07)	Tx: +4 to -3	1.0	0.0
LGS	Rx: -3 to -10	1.0	-7.0
(0156-08)	Tx: +4 to -3	1.0	0.0

#### To set the TLP

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> LEVELS

where pp is the module position number from 1 to 12 and c is 1 or 2

2a. To set the Rx TLP, enter:

RX\_TLP <TLP value> <Return>

where the *TLP value* is within the range and step value for the module variant

**2b.** To set the Tx TLP, enter:

TX\_TLP <TLP value> <Return>

where the TLP value is within the range and step value for the module variant

#### E1.4 Circuit Signalling Types

The signalling type specifies the operating mode of a circuit. The nine signalling options for an LGS circuit are:

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- ☐ Ground Start (GS)
- ☐ Loop Start E&M (LS\_EM)
- ☐ Ground Start E&M (GS\_EM)
- ☐ Dial Pulse Originating (DPO)
- Loop Start and DNIS operation (LS\_DNIS)Ground Start and DNIS operation (GS\_DNIS)
- ☐ Private Line Automatic Ring (PLAR)
- ☐ Private Line Automatic Ring Foreign Exchange Office (PLAR\_FXO)

Default: Private Line Automatic Ring (PLAR)

The signalling types are described in Table E1-2.



NOTE: The DPO softkey does not appear if the LGS circuit is on a module without line reversal capability.

Table E1-2: Signalling Type Description for the LGS Module Circuits

Signalling Type	Description
Loop Start (LS)	In LS operation, a connection is initiated by closing a DC loop between Tip and Ring. An incoming call is signalled with ringing voltage controlled over the T1 link. No ringback tone is applied to the network.
Ground Start (GS)	In the GS operation, a connection is initiated by exchanging momentary ground signals on Tip and Ring between the terminal equipment and the LGS circuit. An incoming call is signalled by exchanging momentary ground signals and ringing voltage controlled over the T1 link.
Loop Start – E&M (LS_EM)	The LS_EM operation converts loop start signalling on the LGS circuit to E&M signalling before it is transmitted over the T1 link.
Ground Start - E&M (GS_EM)	The GS_EM operation converts ground start signalling on the LGS circuit to E&M signalling before it is transmitted over the T1 link.
Dial Pulse Originating (DPO)	In DPO, a connection is established by the closure of a DC loop between Tip and Ring. Normal battery or reverse battery is recognized and signalled over the T1 Link. DPO is used only on a LGS circuit that supports line reversal – a current loop of 30 mA for 300 $\Omega$ , 25 mA for 450 $\Omega$ and 20 mA for 559 $\Omega$ .
Loop Start and DNIS (LS_DNIS)	LS_DNIS operation is the same as LS_EM except that on an incoming call, a programmable wink start indication is transmitted to the network followed by a programmable delay for the received inward calling.
Ground Start and DNIS (GS_DNIS)	GS_DNIS operation is the same as GS_EM except that on an incoming call, a programmable wink start indication is transmitted to the network followed by a programmable delay for the received inward calling.
Private Line Automatic Ring (PLAR)	In PLAR operation, a connection is established by the closure of a DC loop between Tip and Rind. This causes the immediate transmission of ringing signalling to the respect to the T1 link. An incoming call is signalled with ringing voltage controlled over the T1 link. Ringback tone is applied to the network if a fone module or DDS module equipped with a set of tone generation PROMs is installed.
Private Line Automatic Ring – Foreign Exchange Office (PLAR_FXO)	The PLAR_FXO operation denserts FXO from the remote end to PLAR signalling.

# To configure the 1. signalling type

#### l. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION

where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select the signalling type:

LS or GS or LS\_EM or GS\_EM or PLAR or PLAR\_FXO or MORE DPO or MORE LS\_DNIS or MORE GS\_DNIS

The softkey that does not appear is already selected.

#### E1.5 LS\_DNIS and GS\_DNIS Feature

LGS circuits that are configured as LS\_DNIS or GS\_DNIS have a signal that lasts for a period of time, called the wink duration. The wink duration is followed by a delay, called the post-wink duration. You can set the time for the wink duration and post-wink duration.

The range of values for the wink duration, labelled with the softkey WINKTIME, is between 50 milliseconds to 400 milliseconds, in steps of 50 milliseconds.

Default: 250 milliseconds (250 ms)

The range of values for the post-wink duration, labelled with the softkey DIGITTIME, is between 750 milliseconds to 4.25 seconds, in steps of 50 milliseconds.

Default: 750 milliseconds (750 ms)

### To configure the 1. wink duration

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> MORE WINKTIME

where pp is the module position number from 1 to 12 and c is 1 or 2

You are prompted to enter a time.

#### 2. Enter:

<time> <Return>

where *time* is a value between 50 milliseconds to 400 milliseconds, in 50 millisecond steps

If you enter an invalid value, the NMTI displays the warning message, "Invalid integer. The valid range is: 50 to 400".

# To configure the 1. post-wink duration

Enter:

CONFIG CIRCUIT <pp-c> <Return> MORE DIGITTIME

where pp is the module position number from 1 to 12 and c is 1 or 2

You are prompted to enter a time.

#### 2. Enter:

<time> <Return>

where time is a value between 750 milliseconds to 4.25 seconds, in 50 millisecond steps

If you enter an invalid value, the NMTI displays the warning message, "Invalid integer. The valid range is: 750 to 4250".

### E1.6 Fault Signalling

Fault signalling is the signalling condition the 3624 applies to the circuit if the equipment to which it is cross-connected is not available (that is, not physically present or out of synchronization).

The two types of fault signalling are:

- seized (SEIZED)
- idle (IDLE)

Default: idle (IDLE)

# To set fault signalling

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FAULT\_SIG

where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select:

SEIZED or IDLE

The softkey that does not appear is already selected.



NOTE: Changing the fault signalling is permitted on the NMTI even if the circuit is cross-connected, but it does not take effect until the next circuit cross-connection.

### E2. LGE Module

This chapter describes the Loop/Ground Start - Exchange (LGE) module. It includes:

- a description of the module
- setting the voice circuit operating parameters

#### **E2.1** The LGE Module

The LGE module provides an interface to a telephone; it is functionally equivalent to the Foreign Exchange Office (FXO) circuit. The LGE module can be installed on either the Universal Interface card or the LGS Interface card on the 3624.

The module takes two LGE 2-wire analog circuits from the customer premise and passes them on to a primary rate link. The module supports the  $\mu$ -law companding algorithm.

Two variants of the module, that are identified by part number, are available, offering different ranges of transmission level settings and a choice of signalling options.

### **E2.2** About Voice Operating Parameters

When you configure a module position, the circuits on the module in that position are automatically configured with default settings and can be cross-connected. If you try to modify or cross-connect circuits on an unconfigured module position, the NMTI displays an error message.

The configuration parameters for the LGE module are:

- ☐ the Transmission Level Points (TLPs)
- the operating mode (signalling type)
- fault signalling

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record your configuration settings.



NOTE: The procedures in this chapter use the FUNCTION softkey. This softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

#### **E2.3** Transmission Level Points

The Transmission Level Point (TLP) specifies the receive and transmit levels (in decibels) of the signal from a voice circuit with respect to the digital trunk. The receive TLP refers to the digital-to-analog level (the difference between a and b in Figure E2-1) and the transmit TLP refers to the analog-to-digital level (the difference between d and c in Figure E2-1).

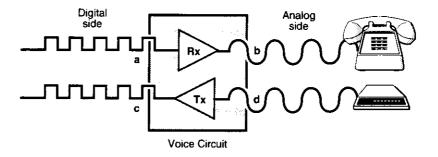


Figure E2-1: TLPs

TLPs use signals measured in dBm, which is the power of a measured signal relative to a reference signal of 1 milliwatt.

A TLP is measured with respect to 0 dBm on the digital side. 0 dBm is equal to 1 mW of power imposed upon an impedance of  $600\Omega$  at a frequency of 1004 Hz. 0 dBm on the digital side is the digital signal required to produce 0 dBm on the analog side of a standard digital-to-analog converter.

For example, a receive TLP of -3 means a digital input of 0 dBm produces an analog output of -3 dBm (see Figure E2-2). The higher the receive TLP, the "louder" the phone conversation sounds.

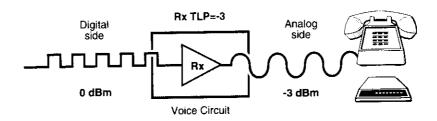


Figure E2-2: An Example of Receive TLPs

A transmit TLP of -3 means an analog signal of -3 dBm is needed to produce 0 dBm on the digital side (see Figure E2-3). The higher the transmit TLP, the "quieter" the phone conversation sounds for a given input signal level.

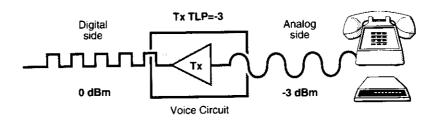


Figure E2-3: An Example of Transmit TLPs

#### **TLP Ranges**

Table E2-1 lists the permissible RX TLP and TX TLP ranges, with the steps, for all LGE voice circuits and gives the default settings.

Table E2-1: Permissible TLPs for LGE Module Circuits

LGE Module	TLP Range	Steps	Default
Circuit	(dBm)	(dBm)	(dBm)
LGE	Rx: 0 to -7	1.0	0.0
(0526-01)	Tx: 0 to -7	1.0	0.0
LGE	Rx: -3 to -10	1.0	-7.0
(0526-03)	Tx: +3 to -4	1.0	0.0

#### To set the TLP

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> LEVELS

where pp is the module position number from 1 to 12 and c is 1 or 2

**2a**. To set the Rx TLP, enter:

RX\_TLP <TLP value> <Return>

where the *TLP value* is within the range and step value for the module variant

**2b.** To set the Tx TLP, enter:

TX\_TLP <TLP value> <Return>

where the *TLP value* is within the range and step value for the module variant

#### **E2.4** Circuit Signalling Types

The signalling type specifies the operating mode of a circuit. The three signalling options for an LGE circuit are:

- ☐ Loop Start (LS)
- ☐ Ground Start (GS)
- Dial Pulse Terminating (DPT)

Default: Ground Start (GS)

The signalling types are described in Table E2-2.

Table E2-2: Signalling Type Description for the LGE Module Circuits

Signalling Type	Description
Loop Start (LS)	In LS operation, a connection is initiated by closing a DC loop between Tip and Ring. An incoming call is signalled with ringing voltage controlled over the T1 link. No ringback tone is applied to the network.
Ground Start (GS)	In the GS operation, a connection is initiated by exchanging momentary ground signals on Tip and Ring between the terminal equipment and the LGS circuit. An incoming call is signalled by exchanging momentary ground signals and ringing voltage controlled over the T1 link.
Dial Pulse Terminating (DPT)	In DPT, a connection is established by the closure of a DC loop between Tip and Ring. Normal battery or reverse battery is recognized and signalled over the T1 Link.

## To configure the 1. signalling type

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION

where pp is the module position number from 1 to 12 and c is 1 or 2

Select the signalling type:

LS or GS or DPT

The softkey that does not appear is already selected.

### E2.5 Fault Signalling

Fault signalling is the signalling condition the 3624 applies to the circuit if the equipment to which it is cross-connected is not available (that is, not physically present or out of synchronization).

The two types of fault signalling are:

- → seized (SEIZED)
- idle (IDLE)

Default: idle (IDLE)

# To set fault signalling

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FAULT\_SIG

where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select:

SEIZED or IDLE

The softkey that does not appear is already selected.



NOTE: Changing the fault signalling is permitted on the NMTI even if the circuit is cross-connected, but it does not take effect until the next circuit cross-connection.



### E3. E&M Module

This chapter describes	the	E&M	module,	including:
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- a description of the module
- setting the voice circuit operating parameters

#### E3.1 The E&M Module

The E&M module takes voice signals from the customer premise equipment such as a Private Branch Exchange (PBX) for formatting and switching before the signals are transmitted onto the primary rate link. The E&M module can be installed in any position on the Universal Interface card.

The module provides two E&M interfaces. The module supports the  $\mu\text{-law}$  companding algorithm.

Two variants of the module, that are identified by part number, are available with each variant having a choice of transmission over 2- or 4-wire paths. Different transmission level settings are offered in the standard and extended range (for the 4-wire path).

### E3.2 About Voice Operating Parameters

When you configure a module position, the circuits on the module in that position are automatically configured with default settings and can be cross-connected. If you try to modify or cross-connect circuits on an unconfigured module position, the NMTI displays an error message.

The configuration parameters for the E&M module are:

- audio transmission, 2- or 4-wire
- The Transmission Level Points (TLPs), standard and extended
- fault signalling

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record your configuration settings.



NOTE: The procedures in this chapter use the FUNCTION softkey. This softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

#### E3.3 Audio Transmission

E&M transmissions can be sent over two types of paths:

- 2-wire operation (2-WIRE)
- **→** 4-wire operation (4-WIRE)

Default: 2-wire operation (2-WIRE)

If you select 4-wire transmission, an extended range of Transmission Level Points (TLPs) becomes available. See section E3.4, "Transmission Level Points", in this chapter.

Changing a circuit from 2-wire to 4-wire operation and vice versa returns the receive and transmit TLPs to their default values.

# To configure the 1. audio transmission

l. Enter:

CONFIG POSITION <pp> <Return> OPTIONS

where pp is the module position number from 1 to 12

2. Select:

2-WIRE or 4-WIRE

The softkey that does not appear is already selected.

#### E3.4 Transmission Level Points

The Transmission Level Point (TLP) specifies the receive and transmit levels (in decibels) of the signal from a voice circuit with respect to the digital trunk. The receive TLP refers to the digital-to-analog level (the difference between **a** and **b** in Figure E3-1) and the transmit TLP refers to the analog-to-digital level (the difference between **d** and **c** in Figure E3-1).

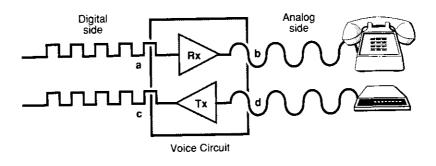


Figure E3-1: TLPs

TLPs use signals measured in dBm, which is the power of a measured signal relative to a reference signal of 1 milliwatt.

A TLP is measured with respect to 0 dBm on the digital side. 0 dBm is equal to 1 mW of power imposed upon an impedance of  $600\Omega$  at a frequency of 1004 Hz. 0 dBm on the digital side is the digital signal required to produce 0 dBm on the analog side of a standard digital-to-analog converter.

For example, a receive TLP of -3 means a digital input of 0 dBm produces an analog output of -3 dBm (see Figure E3-2). The higher the receive TLP, the "louder" the phone conversation sounds.

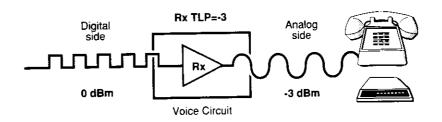


Figure E3-2: An Example of Receive TLPs

A transmit TLP of -3 means an analog signal of -3 dBm is needed to produce 0 dBm on the digital side (see Figure E3-3). The higher the transmit TLP, the "quieter" the phone conversation sounds for a given input signal level.

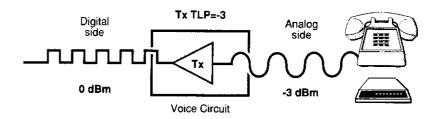


Figure E3-3: An Example of Transmit TLPs

#### **TLP Ranges**

The TLP range can be set to:

- standard range (STANDARD)
- □ extended range (EXTENDED)

Default: standard range (STANDARD)

Table E3-1 lists the permissible standard and extended RX TLP and TX TLP ranges, with the steps, for all E&M voice circuits and gives the default settings.

**E&M Module** Module TLP Range (dBm) Steps Default Module Ranges (dBm) (dBm) E&M STANDARD Rx: +4 to -3.5 0.5 0.0 (0157-01)Tx: +4 to -3.5 0.5 0.0 **EXTENDED** Rx: +3.5 to +11 0.5 +7 Tx: -19.5 to -12 -16 0.5 E&M **STANDARD** Rx: -3.5 to -10 0.5 -7 (0157-03)Tx: +4 to -3.5 0.5 0.0 **EXTENDED** Rx: +3.5 to +11 0.5 Tx: -19.5 to -12 0.5 -16

Table E3-1: Permissible TLPs for E&M Circuits

# To set the standard or extended TLP

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> LEVELS

where pp is the module position number from 1 to 12 and c is 1 or 2

#### 2. Select:

STANDARD or EXTENDED

The softkey that does not appear is already selected.

3a. To set the Rx TLP, enter:

RX\_TLP <TLP value> <Return>

where the *TLP value* is within the range and step value for the module variant

**3b.** To set the Tx TLP, enter:

TX\_TLP <TLP value> <Return>

where the *TLP value* is within the range and step value for the module variant



NOTE: The E&M module's extended TLP range is only available with 4-wire operation. If you change the number of wires and the configured TLP is not supported by the range now available, you must select a new TLP value. The system displays a warning "A new TLP must be selected".

### E3.5 Fault Signalling

Fault signalling is the signalling condition the 3624 applies to the circuit if the equipment to which it is cross-connected is not available (that is, not physically present or out of synchronization).

The two types of fault signalling are:

- ¬ seized (SEIZED)
- ☐ idle (IDLE)

Default: idle (IDLE)



NOTE: Changing the fault signalling is permitted on the NMTI even if the circuit is cross-connected, but it does not take effect until the next circuit cross-connection.

## To set fault signalling

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FAULT\_SIG

where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select:

SEIZED or IDLE

The softkey that does not appear is already selected.

# E4. The Manual Ringdown Module

This chapter describes the Manual Ringdown (MRD) module, including:

a description of the module setting the voice circuit operating parameters

#### E4.1 The MRD Module

The MRD module provides an interface to a telephone. The MRD module can be installed in any position on the Universal Interface card or the LGS Interface card on the 3624.

The module provides a two circuits which offer different ranges of transmission level settings. The module supports the  $\mu$ -law companding algorithm.

### **E4.2** About Voice Operating Parameters

When you configure a module position, the circuits on the module in that position are automatically configured with default settings and then can be cross-connected. If you try to modify or cross-connect circuits on an unconfigured module position, the NMTI displays an error message.

The configuration parameters for the MRD module are:

the Transmission Level Points (TLPs)
fault signalling

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record your configuration settings.

#### **E4.3** Transmission Level Points

The Transmission Level Point (TLP) specifies the receive and transmit levels (in decibels) of the signal from a voice circuit with respect to the digital trunk. The receive TLP refers to the digital-to-analog level (the difference between **a** and **b** in Figure E4-1) and the transmit TLP refers to the analog-to-digital level (the difference between **d** and **c** in Figure E4-1).

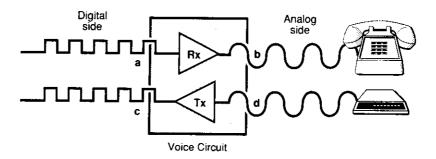


Figure E4-1: TLPs

TLPs use signals measured in dBm, which is the power of a measured signal relative to a reference signal of 1 milliwatt.

A TLP is measured with respect to 0 dBm on the digital side. 0 dBm is equal to 1 mW of power imposed upon an impedance of  $600\Omega$  at a frequency of 1004 Hz. 0 dBm on the digital side is the digital signal required to produce 0 dBm on the analog side of a standard digital-to-analog converter.

For example, a receive TLP of -3 means a digital input of 0 dBm produces an analog output of -3 dBm (see Figure E4-2). The higher the receive TLP, the "louder" the phone conversation sounds.

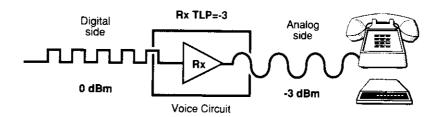


Figure E4-2: An Example of Receive TLPs

A transmit TLP of -3 means an analog signal of -3 dBm is needed to produce 0 dBm on the digital side (see Figure E4-3). The higher the transmit TLP, the "quieter" the phone conversation sounds for a given input signal level.

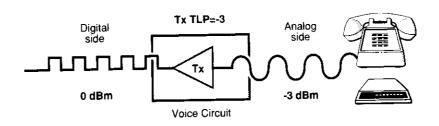


Figure E4-3: An Example of Transmit TLPs

#### TLP ranges

Table E4-1 lists the permissible RX TLP and TX TLP ranges, with the steps, for MRD circuits and gives the default settings.

Table E4-1: Permissible TLPs for MRD Module Circuits

TLP Range	Steps	Default
(dBm)	(dBm)	(dBm)
Rx: 0 to -15 Tx: 0 to -15	1.0 1.0	0.0

#### To set TLP

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> LEVELS

where pp is the module position number from 1 to 12 and c is 1 or 2

2a. To set the Rx TLP, enter:

RX\_TLP <TLP value> <Return>

where the TLP value is within the range

**2b.** To set the Tx TLP, enter:

TX\_TLP <TLP value> <Return>

where the TLP value is within the range

#### E4.4 Fault Signalling

Fault signalling is the signalling condition the 3624 applies to the interface being configured if the equipment to which it is cross-connected is not available (that is, not physically present or out of synchronization).

The two types of fault signalling are:

- □ seized (SEIZED)
- idle (IDLE)

Default: idle (IDLE)



NOTE: Changing the fault signalling is permitted on the NMTI even if the circuit is cross-connected, but it does not take effect until the next circuit cross-connection.

# To set fault signalling

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FAULT\_SIG

where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select:

SEIZED or IDLE

The softkey that does not appear is already selected.

# F. Data Modules

### F1. The DNIC Module

This chapter describes the Digital Network Interface Circuit (DNIC) module, including:

- ☐ a description of the module
- setting the data circuit operating parameters

#### F1.1 The DNIC Module

The DNIC module allows data equipment to be connected to primary rate digital networks. It provides terminations for basic rate 2B+D data transmission over a single twisted pair of wires. It connects to data devices through 2600-series (2601, 2602, 2603, 2606, 2608, and 2610) MainStreet Data Termination Units (DTUs). Transparent and High Capacity Multiplexing (HCM) sub-rate multiplexing and multi-drop data bridging are supported.

The module can be installed in any module position on the Universal Interface card.

The DNIC module has two circuits. The circuits are numbered A and B. Each circuit supports one DTU, which provides either two or eight data interfaces.

When you configure a DNIC circuit, much of what you are actually configuring are the operating parameters of the *MainStreet* Data Termination Unit (DTU) connected to the DNIC module. When you set the data circuit operating parameters, you need to set the parameters for the device connected to circuit A and then set the parameters for the device connected to circuit B.



NOTE: To operate a DNIC module a DTU module must be installed in the Control card's DTU socket as described in Chapter 5, The Control Card Modules, in the Installation manual.

#### F1.2 About Data Operating Parameters

Before any of the procedures in this chapter can be implemented you must:

configure the module position(s) for the DNIC module(s)
know the operating characteristics of the data device connected directly or indirectly to each circuit

When you configure a module position, the circuits on the module in that position are automatically configured with default settings and can be cross-connected. If you try to modify or cross-connect circuits on an unconfigured module position, the NMTI displays an error message.

The configuration parameters for the DNIC module are:

J	the device mode (synchronous/asynchronous)
J	the device gender (DTE/DCE)
$\supset$	the duplex method
_	the RTS/CTS delay
)	the control signals
_	the data structure (character length, stop bits, parity)
	the timing source
	the multi-drop data bridge

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.



NOTE: The procedures in this chapter use the FUNCTION softkey. This softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

#### F1.3 Device Mode

Data circuits support two device modes:

☐ synchronous (SYNC)

☐ asynchronous (ASYNC)

Default: synchronous (SYNC)

Asynchronous devices transmit data one character at a time. A character can be represented by (5, 6, 7, or 8 bits), with start and stop bits used to mark the beginning and end of the character.



NOTE: If ASYNC is selected, transparent rate adaption cannot be used.

Synchronous devices transmit a continuous stream of characters. Synchronization between the devices is maintained through timing signals that are transmitted separately.

For the 2606, 2608, and 2610 Data Termination Units, the A circuit (*pp*-A), which configures the aggregate port, is always synchronous The B circuit (*pp*-B), which configures the branch ports, is always asynchronous for the 2608 and 2610 and can be configured as either asynchronous or synchronous. For all other DTUs, the device mode is configurable.

### To set the device 1. mode

. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION I/F\_MODE

where pp is the module position number from 1 to 12

2. Select the device mode:

ASYNC or SYNC

The softkey that does not appear is already selected.

#### F1.4 Device Gender

DNIC circuits support two device genders:

- data termination equipment (DTE)
- data communications equipment (DCE)

Default: data communications equipment (DCE)

Data and control signals are wire pairs. The device gender indicates which wire in the pair is used to send/receive the data or control signal. A DTE device sends data or control signals on one of the wires; a DCE device sends signals on the other wire.

For example, the TXD signal means data is transmitted by a DTE and received by a DCE and the RXD signal means data received by a DTE and transmitted by a DCE.

F. Data Modules

In general, terminals and printers are DTE while modems are DCE. However, there are many exceptions. If the device's owner's manual indicates with words or graphics that the TXD signal is "outgoing", the device is DTE; if it is "incoming", the device is DCE. The opposite is true for the RXD signal.

## To set the device 1. gender

1. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION I/F\_MODE

where pp is the module position number from 1 to 12

2. Select the gender opposite to that of the data device connected to the circuit:

DTE or DCE

The softkey that does not appear is already selected.

#### F1.5 Duplex Method

DNIC circuits support two duplex modes:

☐ half-duplex (HALF\_DPLX)

☐ full-duplex (FULL\_DPLX)

Default: full-duplex (FULL\_DPLX)

Half-duplex transmission uses a single transmission path. Two connected devices can transmit and receive, but not at the same time.

Full-duplex transmission uses two independent transmission paths, one in each direction. This allows two connected devices to transmit and receive data simultaneously.

If you select full-duplex, the RTS/CTS delay option cannot be configured (see section F1.6, "RTS/CTS Delay" in this chapter). The duplex method is automatically configured when a circuit is configured for a multi-drop data bridge (see section F1.10, "Multi-drop Data Bridge", in this chapter).

### To set the duplex 1. method

1. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION I/F\_MODE

where pp is the module position number from 1 to 12

Select the duplex mode of the data device connected directly or indirectly to the data circuit:

HALF\_DPLX or FULL\_DPLX

The softkey that does not appear is already selected.

### F1.6 RTS/CTS Delay

Control signals Request To Send (RTS) and Clear To Send (CTS) regulate the direction of data flow on half-duplex lines. When one device wants to send a message to another, it asserts RTS. The modem connected to this device asserts CTS after a time delay. This time delay must be long enough to allow for the line to be cleared of any messages coming into the device. The time delay is called RTS/CTS delay.

For example, the RTS/CTS delay is used in multi-drop data bridges to make a slave device wait long enough to guarantee a transmission path has been established to the master device. An RTS/CTS delay that is too short results in messages being lost. A delay that is too long decreases response time. The optimum value depends on your network.

The range for RTS/CTS delay is 0 to 1250 milliseconds in 10 millisecond increments.

Default: 0 milliseconds (0)

The actual RTS to CTS delay time may be up to 20 milliseconds longer than the configured delay time. This delay is in addition to any transmission delay (which may be up to 500 milliseconds for satellite links).



NOTE: For DNIC circuits the RTS/CTS delay is only configurable if the circuit is configured as half-duplex mode (see section F1.5, "Duplex Method", in this chapter) or as a multi-drop slave (see section F1.10, "Multi-drop Data Bridge", in this chapter).

# To set the RTS/CTS delay

1. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION I/F\_MODE RTS/CTS

where pp is the module position number from 1 to 12

The system prompts you to enter the RTS/CTS delay length.

2.	Enter	the	RTS/	CTS	delay	<i>v</i> :
----	-------	-----	------	-----	-------	------------

<time> <Return>

where the range is 0 to 1250 milliseconds in 10 millisecond increments

#### F1.7 Control Signals

Control signals provide the handshaking required for call set up, clearing calls, and synchronization.

The control signals, that can be configured, are:

- ☐ Data Terminal Ready (DTR)
- ☐ Request To Send (RTS)
- ☐ Analog Loopback (ALB)
- ☐ Remote Digital Loopback (RDL)
- Data Set Ready (DSR)
- ☐ Data Carrier Detect (DCD)
- ☐ Clear To Send (CTS)
- ☐ Ring Indicator (RI)

If the device is configured as DTE, the inputs are DSR, DCD, CTS and RI and the outputs are DTR, RTS, ALB and RDL. If the device is configured as DCE, the inputs and outputs are reversed.

If the device is configured as synchronous, DTR and DSR are not functional.

Control signals can be configured as:

- ☐ high (ON)
- □ low (OFF)
- ☐ end to end (END\_TO\_END)

When the control signals are configured as end-to-end, the state of the local signal follows that of the signal source at the remote end of the network. This option is only available if HCM rate adaption is selected.

Table F1-1 shows the control leads with their default setting.

Table F1-1: Control Leads for the DNIC Module

Module	Operating Mode	Inputs Default		Outputs	Default
		DTR	END_TO_END	DSR	FORCED_ON
	DCE	RTS	END_TO_END	DCD	END_TO_END
		ALB	END_TO_END	CTS	END_TO_END
DNIC		RDL	END_TO_END	RI	FORCED_OFF
5		DSR	END_TO_END	DTR	FORCED_ON
	DTE	DCD	END_TO_END	RTS	END_TO_END
		CTS	END_TO_END	ALB	END_TO_END
		RI	END_TO_END	RDL	FORCED_ON

# DTUs and control signals

For 56 kb/s transparent channels, when RTS is set for end-to-end operation, the value of RTS is forced into bit position 8. The far end DTU maps RTS to its own DCD lead going to the DTE devices. With both DTUs operating in end-to-end signalling, incoming RTS in bit position 8 is mapped to DCD.

For the 2602 MainStreet DTU, which supports X.21 devices, the control signal (C) is represented on the NMTI by RTS (if DTE) or DCD (if DCE). The indicator signal (I) is represented on the NMTI by DCD (if DTE) or RTS (if DCE). The other control signals are not used.

For the 2608 MainStreet DTU, only two inputs (DTR and RTS) and two outputs (DSR and DCD) are supported for the B circuit (pp-B), which configures the branch ports. This circuit is always DCE. This parameter is not relevant to the A circuit (pp-A), which configures the aggregate port.

For the other DTUs all the control signals are configurable as detailed above.



NOTE: Control signals are the only interface parameter that can be set for a circuit configured as a timing source. Control signals can be changed if a circuit is cross-connected.

# To configure the 1. control signals

Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION CTRL\_LEADS

where pp is the module position number from 1 to 12

#### 2. Select:

**INPUTS or OUTPUTS** 

On the NMTI display, the inputs signals for DTU ports are listed are in the left column. The outputs are listed in the right column.

3. Select the control lead:

DSR or DCD or CTS or RI or DTR or RTS or ALB or RDL

4. Select the status:

ON or OFF or END\_TO\_END

Th softkey that does not appear is already selected.

### F1.8 Data Structure (Asynchronous only)

Three characteristics of asynchronous data, that is sent by the data device, can be configured:

- ☐ character length
- number of stop bits
- type of parity

For the 2606, 2608 and 2610 MainStreet DTUs, these three parameters can only be set for the B circuit (*pp*-B), which configures the asynchronous branch ports. It is not relevant to the A circuit (*pp*-A), which configures the synchronous aggregate port.

The three parameters can be configured for the 2601, 2602, and 2603 DTUs.



NOTE: The sum of the start bit (always 1), the character length (5, 6, 7 or 8), the stop bits (1 or 2) and the parity (0 for no parity or 1 for odd, even, mark or space) must equal 8, 9, 10 or 11. For example, if the character length is set to 5 bits and the number of stop bits is set to 1, the parity can not be set to NONE. If this rule would be broken by a selection the relevant softkeys are not displayed.

## Character length

Character length is the number of data bits used to transmit a character in asynchronous transmission. Character length can be set to:

- □ 5 bits (5\_BITS)
- ☐ 6 bits (6\_BITS)
- ☐ 7 bits (7\_BITS)
- 8 bits (8\_BITS)

Default: 8 bits (8\_BITS)

# To set the character length

#### 1. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION CHAR\_LEN

where pp is the module position number from 1 to 12

2. Select the number of bits in a character used by the attached device:

5\_BITS or 6\_BITS or 7\_BITS or 8\_BITS

The softkey that does not appear is already selected.

### Stop bits

Stop bits signify the end of a character in asynchronous transmission. The 3624 supports the following stop bit formats:

- ☐ 1 bit (1\_BIT)
- 2 bits (2\_BITS)

Default: 1 bit (1\_BIT)

# To set the number of stop bits

#### 1. Enter:

CONFIG CIRCUIT  $< pp-A > or < pp-B > < Return > FUNCTION STOP_BITS$ 

where pp is the module position number from 1 to 12

2. Set the number of stop bits used by the attached device, select:

1\_BIT or 2\_BITS

The softkey that does not appear is already selected.

#### Parity

Parity is an error detection method that adds an extra bit to each transmitted character. It is based on the number of 0s or 1s in each character.

The 3624 supports five parity schemes:

- ☐ no parity (NONE)
- □ odd (ODD)
- □ even (EVEN)
- ☐ mark (MARK)
- ☐ space (SPACE)

Default: no parity (NONE)

#### To set the parity

1. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION PARITY

where pp is the module position number from 1 to 12

Select the parity scheme used by the attached device:

NONE or ODD or EVEN or MARK or SPACE

The softkey that does not appear is already selected.

## F1.9 Clocking (Synchronous only)

Synchronous data devices require two timing sources: one for "receive data" and one for "transmit data". The timing source for the receive data is called the receive clock; the timing source for the transmit data is called the transmit clock. Notice that "transmit" and "receive" are defined relative to the data device configured as Data Terminal Equipment (DTE). That is, DTE devices use the transmit clock to transmit data and DCE devices use it to receive data. See Figure F1-1.

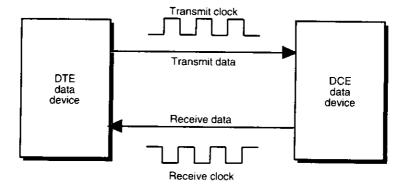


Figure F1-1: Transmit and Receive Clocks

Tran	em	iŧ	c١	ack
ITAH	<b>SIII</b>			THE D

The source of the transmit clock between the data circuit and the attached local device can be set. The transmit clock can be supplied by:

- the attached device (external clock)
- The data circuit to which the device is attached (internal clock)
- a remote source (slave clock)

The parameter setting is different depending on whether the circuit is in DCE or DTE mode.

If the circuit is in DCE mode (that is, the attached device is DTE):

- "external" means the users equipment provides the transmit clock, that is, the XCLK pin from the DTU (EXTERNAL);
- "internal" means the Baud Rate Generator (BRG) in the DTU provides the transmit clock. The BRG is locked to system timing. Internal is only available with HCM rate adaption (INTERNAL); and
- "slave" means the circuit is extracting transmit clock timing from the data stream (SLAVE).

If the circuit is in DTE mode (that is, the attached device is DCE), you can select slave, external, or internal as the clocking source of the attached DCE device.

Default: timing is extracted from the data stream (SLAVE)

The A circuit (*pp*-A) on the 2606, 2608 and 2610 DTUs (which configures the aggregate port) cannot be configured for a clocking source. For the B circuit (*pp*-B) on 2606 DTUs, you can select slave or external as the clocking source when the device mode is set as synchronous. The clocking source cannot be selected for the B circuit of the 2606 DTU if the device mode is asynchronous or for the 2608 and 2610 DTUs because the B circuit is always asynchronous.

You can also configure the effect the *3624* has on clocks passing through it. The clocks can be:

- "locked" indicates that the data clocks are locked to the 3624 timing (LOCKED)
- "independent" indicates that the data clocks are passing through the 3624 transparently (INDEPNT)

Default: locked (LOCKED)

If the clocking for a circuit is independent, the clocking information is embedded in the signalling bit of an HCM frame and passed through transparently. In the independent mode, deviations of up to 50 b/s relative to the nominal rate can be accommodated.

For more information, ask your Newbridge representative for Configuration Note NCN305, entitled "Data Interface Clocking".

## To configure the 1. transmit clock

1. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION CLOCKING

where pp is the module position number from 1 to 12

2. Enter the source of the transmit clock:

INTERNAL or SLAVE or EXTERNAL

The softkey that does not appear is already selected.

3. Select:

LOCKED or INDEPNT

The softkey that does not appear is already selected.



NOTE: The INTERNAL softkey is not available if transparent or DDS rate adaption is selected.

## F1.10 Multi-drop Data Bridge

In a multi-drop data bridge, two or more circuits take turns using the same bandwidth to communicate with another circuit. For example, several terminals may take turns communicating with a computer. The one circuit that all the other circuits communicate with (e.g., the circuit connected to the computer) is designated the master; the remaining circuits (e.g., connected to terminals) are designated slaves. See Figure F1-2.

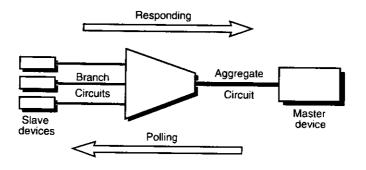


Figure F1-2: Multi-drop Data Bridge

The master device controls the shared bandwidth by polling the slave devices one after the other, asking each if it has data to send to the master. Only one slave may transmit at a time.

If, for example, your 3624 MainStreet is part of a network that includes a 3600 MainStreet Bandwidth Manager, you can configure 3624 circuits for a multi-drop data bridge.

Each data circuit is designated as one of the following:

_	master (MASTER)
	slave (SLAVE)
J	not part of a multi-drop data bridge (DISABLE)

Default: not part of a multi-drop data bridge (DISABLE)

One circuit in a multi-drop data bridge must be designated the "master". The 3624 automatically changes the configuration of the circuit to full-duplex and turns signalling off if HCM rate adaption is used. (See Chapter G2, HCM Rate Adaption, in this manual for information on signalling.).

All other circuits in the multi-drop data bridge are designated "slave". The 3624 automatically changes the configuration of the circuit to half-duplex and turns signalling off.

The data on each circuit must occupy the same amount of bandwidth with the same starting data position. Each slave device transmits data in that bandwidth at a different time. The master device sends its polling messages and looks for data from the slave devices in that bandwidth. See the chapter on the selected type of rate adaption (Chapter G1, Transparent Rate Adaption, Chapter G2, HCM Rate Adaption, or Chapter G3, DDS Rate Adaption, in this manual) for setting the data position.

If the circuit is configured as gender DCE, the DCD control signal must be forced on. If the circuit is configured as DTE, the RTS control signal must be forced on. See section F1.7, "Control Signals", in this chapter, to set the control signals.

The copy adjust function must not be used when configuring circuits that are part of the same multi-drop data bridge.

F. Data Modules F1-13

# To configure a master or slave device

#### 1. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION I/F\_MODE MULTIDROP

where pp is the module position number from 1 to 12

#### 2. Select:

MASTER or SLAVE

The softkey that does not appear is already selected.

# To remove a master or slave device

#### 1. Enter:

CONFIG CIRCUIT <pp-A> or <pp-B> <Return> FUNCTION I/F\_MODE MULTIDROP DISABLE

where pp is the module position number from 1 to 12

If the DISABLE softkey does not appear, the multi-drop data bridge is already disabled.

# F2. The RS-232 Direct Connect Module

This chapter describes the RS-232 Direct Connect Module (DCM), including:

- a description of the module
- setting the data circuit operating parameters

### **F2.1** The RS-232 DCM

The RS-232 DCM is a dual circuit module used to provide two synchronous/asynchronous network interfaces.

The RS-232 DCM has data devices connected directly to it, therefore it does not require a DTU module on the Control card or DTUs attached to it.

The module can be installed in any module position on the Universal Interface card.

## F2.2 About Data Operating Parameters

Before any of the procedures in this chapter can be implemented, you must:

- configure the module positions for the appropriate data modules
- know the operating characteristics of the data device connected directly to each circuit

When you configure a module position, the circuits on the module in that position are automatically configured with default settings and can be cross-connected. If you try to modify or cross-connect circuits on an unconfigured module position, the NMTI displays an error message.

The configuration parameters for the RS-232 DCMs are:

- ☐ the device mode (synchronous/asynchronous)
- ☐ the device gender (DTE/DCE)
- ☐ the duplex method
- ☐ the RTS/CTS delay
- the control signals
- the data structure (character length, stop bits, parity)
- the timing source
- the multi-drop data bridge

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.



NOTE: The procedures in this chapter use the FUNCTION softkey. This softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

#### F2.3 Device Mode

RS-232 DCM circuits support two device modes:

- synchronous (SYNC)
- □ asynchronous (ASYNC)

Default: synchronous (SYNC)

Asynchronous devices transmit data one character at a time. A character can be represented by (5, 6, 7, or 8 bits), with start and stop bits used to mark the beginning and end of the character.



NOTE: If ASYNC is selected, transparent rate adaption cannot be used.

Synchronous devices transmit a continuous stream of characters. Synchronization between the devices is maintained through timing signals that are transmitted separately.

## To set the device 1. mode

1. Enter:

CONFIG CIRCUIT  $\langle pp-c \rangle$  <Return> FUNCTION I/F\_MODE where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select the device mode:

ASYNC or SYNC

The softkey that does not appear is already selected.

#### F2.4 Device Gender

RS-232 DCM circuits support two device genders:

- data termination equipment (DTE)
- data communications equipment (DCE)

Default: data communications equipment (DCE)

Data and control signals are wire pairs. The device gender indicates which wire in the pair is used to send/receive the data or control signal. A DTE device sends data or control signals on one of the wires; a DCE device sends signals on the other wire. For example, the TXD signal means data is transmitted by a DTE and received by a DCE and the RXD signal means data received by a DTE and transmitted by a DCE.

In general, terminals and printers are DTE while modems are DCE. However, there are many exceptions. If the device's owner's manual indicates with words or graphics that the TXD signal is "outgoing", the device is DTE; if it is "incoming", the device is DCE. The opposite is true for the RXD signal.

## To set the device 1. gender

. Enter:

CONFIG CIRCUIT  $< pp-c > < Return > FUNCTION I/F\_MODE$  where pp is the module position number from 1 to 12 and c is 1 or 2

Select the gender opposite to that of the data device connected to the circuit:

DTE or DCE

The softkey that does not appear is already selected.

## F2.5 Duplex Method

Half-duplex transmission uses a single transmission path. Two connected devices can transmit and receive, but not at the same time.

Full duplex transmission uses two independent transmission paths, one in each direction which allows two connected devices to transmit and receive data simultaneously.

The duplex method, either half-duplex or full-duplex, is not configurable for RS-232 DCMs; it is set to full-duplex automatically. It is automatically changed when a circuit is configured for a multi-drop data bridge (see section F2.10, "Multi-drop Data Bridge", in this chapter).

## F2.6 RTS/CTS Delay

Control signals Request To Send (RTS) and Clear To Send (CTS) regulate the direction of data flow on half-duplex lines. When one device wants to send a message to another, it asserts RTS. The modem connected to this device asserts CTS after a time delay. This time delay must be long enough to allow for the line to be cleared of any messages coming into the device. The time delay is called RTS/CTS delay.

For example, the RTS/CTS delay is used in multi-drop data bridges to make a slave device wait long enough to guarantee a transmission path has been established to the master device. An RTS/CTS delay that is too short results in messages being lost on the line. A delay that is too long decreases response time. The optimum value depends on your network.

For RS-232 DCM circuits, the RTS/CTS delay is only configurable if, first, the circuit is configured as a multi-drop data bridge slave (see section F2.10, "Multi-drop Data Bridge", in this chapter).

The range for RTS/CTS delay is 0 to 140 milliseconds in 20 millisecond increments.

Default: 0 milliseconds (0)

The actual RTS to CTS delay time may be up to 20 milliseconds longer than the configured delay time. This delay is in addition to any transmission delay (which may be up to 500 milliseconds for satellite links).

# To set the RTS/CTS delay

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_MODE RTS/CTS

where pp is the module position number from 1 to 12 and c is 1 or 2

The RTS/CTS softkey appears after the circuit has been configured as multi-drop data bridge slave.

The system prompts you to enter the length of the RTS/CTS delay.

#### 2. Enter the RTS/CTS delay:

<time> <Return>

where the range is 0 to 140 milliseconds in 20 millisecond increments

## F2.7 Control Signals

Control signals provide the handshaking required for call set up, clearing calls, and synchronization.

The control signals, that can be configured, are:

- ☐ Data Terminal Ready (DTR)
- ☐ Data Set Ready (DSR)
- ☐ Request To Send (RTS)
- Clear To Send (CTS)
- Data Carrier Detect (DCD)

The control leads that are applicable to the operating mode of the RS-232 DCM are shown in Table F2-1. The default settings are also shown. If the device is configured as synchronous, DTR and DSR are not functional.

Control signals can be configured as:

- high (ON)
- low (OFF)
- end to end (END\_TO\_END)

Table F2-1: Control Leads for the RS-232 DCM

Module	Operating Mode	Inputs Default		Outputs	Default	
-	Async DCE	RTS DTR	END_TO_END END_TO_END	CTS DSR	END_TO_END FORCED_ON	
RS-232 DCM	Async DTE	DCD DSR	END_TO_END END_TO_END	RTS DTR	END_TO_END FORCED_ON	
	Sync DCE (Slave or External)	RTS	END_TO_END	стѕ	END_TO_END	
	Sync DTE (Internal)		-	RTS	END_TO_END	
	Sync DTE (Slave or External)	DCD	END_TO_END	RTS	END_TO_END	

When the control signals are configured as end-to-end, the state of the local signal follows that of the signal source at the remote end of the network. This option is only available if HCM rate adaption is selected.



NOTE: Control signals are the only interface parameter that can be set for a circuit configured as a timing source. Control signals can be changed if a circuit is cross-connected.

F. Data Modules

## To configure the 1. control signals

#### Enter:

CONFIG CIRCUIT  $\langle pp-c \rangle$  <Return> FUNCTION CTRL\_LEADS where pp is the module position number from 1 to 12 and c is 1 or 2

#### 2. Select:

INPUTS or OUTPUTS

On the NMTI display, the inputs signals are listed are in the left column. The outputs are listed in the right column.

3. Select the control lead:

DSR or DCD or CTS or DTR or RTS

4. Select the status:

ON or OFF or END\_TO\_END

The softkey that does not appear is already selected.

## F2.8 Data Structure (Asynchronous only)

Three characteristics of asynchronous data, that is sent by the data device, can be configured:

- character length
- number of stop bits
- type of parity



NOTE: The sum of the start bit (always 1), the character length (5, 6, 7 or 8), the stop bits (1 or 2) and the parity (0 for no parity or 1 for odd, even, mark or space) must equal 8, 9, 10 or 11. For example, if the character length is set to 5 bits and the number of stop bits is set to 1, the parity can not be set to NONE. If this rule would be broken by a selection, the relevant softkeys are not displayed.

Character length Character length is the number of data bits used to transmit a character in asynchronous transmission. Character length can be set to:

- 5 bits (5\_BITS)
- 6 bits (6\_BITS)
- ☐ 7 bits (7\_BITS)
- → 8 bits (8\_BITS)

Default: 8 bits (8\_BITS)

### To set the character length

Enter: 1.

> CONFIG CIRCUIT <pp-c> <Return> FUNCTION CHAR\_LEN where pp is the module position number from 1 to 12 and c is 1 or 2

Select the number of bits in a character used by the attached device:

5\_BITS or 6\_BITS or 7\_BITS or 8\_BITS

The softkey that does not appear is already selected.

#### Stop bits

Stop bits signify the end of a character in asynchronous transmission. The 3624 supports the following stop bit formats:

- 1 bit (1\_BIT)
- 2 bits (2\_BITS

Default: 1 bit (1\_BIT)

#### To set the number of stop bits

Enter: 1.

> CONFIG CIRCUIT <pp-c> <Return> FUNCTION STOP\_BITS where pp is the module position number from 1 to 12 and c is 1 or 2

Set the number of stop bits used by the attached device, select: 2.

1\_BIT or 2\_BITS

The softkey that does not appear is already selected.

F2-7 F. Data Modules

#### **Parity**

Parity is an error detection method that adds an extra bit to each transmitted character. It is based on the number of 0s or 1s in each character.

The 3624 supports five parity schemes:

- ☐ no parity (NONE)
- odd (ODD)

Enter:

- □ even (EVEN)
- ☐ mark (MARK)
- ☐ space (SPACE)

Default: no parity (NONE)

#### To set the parity 1.

CONFIG CIRCUIT <pp-c> <Return> FUNCTION PARITY

where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select the parity scheme used by the attached device:

NONE or ODD or EVEN or MARK or SPACE

The softkey that does not appear is already selected.

## F2.9 Clocking (Synchronous only)

Synchronous data devices require two timing sources: one for "receive data" and one for "transmit data". The timing source for the receive data is called the receive clock; the timing source for the transmit data is called the transmit clock. Notice that "transmit" and "receive" are defined relative to the data device configured as Data Terminal Equipment (DTE). That is, DTE devices use the transmit clock to transmit data and DCE devices use it to receive data. See Figure F2-1.

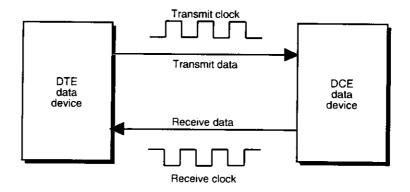


Figure F2-1: Transmit and Receive Clocks

### Transmit clock

The source of the transmit clock between the data circuit and the attached local device can be set. The transmit clock can be supplied by:

- the attached device (external clock) ì
- the data circuit to which the device is attached (internal clock) J
- a remote source (slave clock)

The parameter setting is different depending on whether the circuit is in DCE or DTE mode.

When the device mode is synchronous, the clocking source is selected between the RS-232 DCM and the attached data device.

For DCE gender, the options are:

- the transmit clock is extracted from the data stream (SLAVE)
- the transmit clock is provided by the user equipment (EXTERNAL)

For the DTE gender, the options are:

- SLAVE
- **EXTERNAL**
- the transmit clock is provided by a Baud Rate Generator on the DCM, which is locked to the system timing (INTERNAL)

The clock also can be set:

- to the timing of the 3624 (LOCKED), or
- to be passed through transparently (INDEPNT)

Default: SLAVE LOCKED

If the clocking for a circuit is independent, the clocking information is embedded in the signalling bit of an HCM frame and passed through transparently. Deviations of up to 50 b/s relative to the nominal rate can be accommodated.

For more information, ask your Newbridge representative for Configuration Note NCN305, entitled "Data Interface Clocking".



NOTE: The INTERNAL softkey is not available if transparent or DDS rate adaption is selected.

F2-9 F. Data Modules

## To configure the 1. transmit clock

1. Enter:

CONFIG CIRCUIT  $\langle pp-c \rangle$  <Return> FUNCTION CLOCKING where pp is the module position number from 1 to 12 and c is 1 or 2

2. Enter the source of the transmit clock:

INTERNAL or SLAVE or EXTERNAL

The softkey that does not appear is already selected.

3. Select:

LOCKED or INDEPNT

The softkey that does not appear is already selected.

## F2.10 Multi-drop Data Bridge

In a multi-drop data bridge, two or more circuits take turns using the same bandwidth to communicate with another circuit. For example, several terminals may take turns communicating with a computer. The one circuit that all the other circuits communicate with (e.g., the circuit connected to the computer) is designated the master; the remaining circuits (e.g., connected to terminals) are designated slaves. See Figure F2-2.

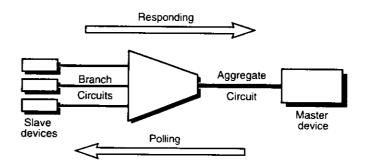


Figure F2-2: Multi-drop Data Bridge

The master device controls the shared bandwidth by polling the slave devices one after the other, asking each if it has data to send to the master. Only one slave may transmit at a time.

If, for example, your 3624 MainStreet is part of a network that includes a 3600 MainStreet Bandwidth Manager, you can configure 3624 circuits for a multidrop data bridge.

Each data circuit is designated as one of the following:

- master (MASTER)
- □ slave (SLAVE)
- ☐ not part of a multi-drop data bridge (DISABLE)

Default: not part of a multi-drop data bridge (DISABLE)

One circuit in a multi-drop data bridge must be designated the "master'. The 3624 automatically changes the configuration of the circuit to full-duplex and turns signalling off if HCM rate adaption is used. (See Chapter G2, HCM Rate Adaption, in this manual for information on signalling).

All other circuits in the multi-drop data bridge are designated "slave". The 3624 automatically changes the configuration of the circuit to half-duplex and turns signalling off.

The data on each circuit must occupy the same amount of bandwidth with the same starting data position. Each slave device transmits data in that bandwidth at a different time. The master device sends its polling messages and looks for data from the slave devices in that bandwidth. See the chapter on the selected type of rate adaption (Chapter G1, Transparent Rate Adaption, Chapter G2, HCM Rate Adaption, or Chapter G3, DDS Rate Adaption, in this manual).

If the circuit is configured as gender DCE, the DCD control signal must be forced on. If the circuit is configured as DTE, the RTS control signal must be forced on. See section F2.7, "Control Signals", in this chapter, to set the control signals.

The copy adjust function must not be used when configuring circuits that are to part of the same multi-drop data bridge.

# To configure a master or slave device

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_MODE MULTIDROP

where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select:

MASTER or SLAVE

The softkey that does not appear is already selected.

F. Data Modules

# To remove a master or slave device

#### 1. Enter:

CONFIG CIRCUIT *<pp-c>* <Return> FUNCTION I/F\_MODE MULTIDROP DISABLE

where pp is the module position number from 1 to 12 and c is 1 or 2

If the DISABLE softkey does not appear, the multi-drop data bridge is already disabled.

# F3. The X.21 and V.35 Direct Connect Modules

This chapter describes the X.21 and V.35 Direct Connect Modules (DCMs), including:

a description of the modules setting the data circuit operating parameters the configuration of super-rate circuits

## F3.1 The X.21 and V.35 DCMs

The X.21 Direct Connect Module (DCM) and the V.35 Direct Connect Module (DCM) are both single circuit modules that provide a synchronous/asynchronous network interface.

These DCMs have data devices connected directly to them; therefore, they do not require a DTU module on the Control card or DTUs attached to them.

The modules can be installed in any module position on the Universal Interface card for sub-rate interface speeds. The module positions for superrate interface speeds are described in section F3.11, "Super-rate Circuits", in this chapter.

## F3.2 About Data Operating Parameters

Before any of the procedures in this chapter can be implemented you must:

configure the module positions for the appropriate data modules
 know the operating characteristics of the data device connected directly to the circuit

When you configure the module position, the circuit on the module in that position is automatically configured with default settings and can be cross-connected. If you try to modify or cross-connect the circuit on an unconfigured module position, the NMTI displays an error message.

F. Data Modules

	The circuit configuration parameters for the X.21 and V.35 DCMs are:
	the device mode (synchronous/asynchronous) the device gender (DTE/DCE) the duplex method the RTS/CTS delay the control signals the data structure (character length, stop bits, parity) the timing source the multi-drop data bridge
	Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.
1	NOTE: The procedures in this chapter use the FUNCTION softkey. This softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.
Device M	<b>l</b> ode
	The circuit on the X.21 and V.35 DCMs supports two device modes:
	synchronous (SYNC) asynchronous (ASYNC)
	Default: synchronous (SYNC)
	Asynchronous devices transmit data one character at a time. A character can be represented by (5, 6, 7, or 8 bits), with start and stop bits used to mark the beginning and end of the character.
<del>द्र</del> ीर	NOTE: If asynchronous mode is selected transparent rate adaption cannot be used.

that are transmitted separately.

Synchronous devices transmit a continuous stream of characters.

Synchronization between the devices is maintained through timing signals

F3.3

## To set the device 1. mode

. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_MODE

where pp is the module position number from 1 to 12 and c is 1

2. Select the device mode:

ASYNC or SYNC

The softkey that does not appear is already selected.

### F3.4 Device Gender

The circuit on the X.21 and V.35 DCMs supports two device genders:

- data termination equipment (DTE)
- data communications equipment (DCE)

Default: data communications equipment (DCE)

Data and control signals are wire pairs. The device gender indicates which wire in the pair is used to send/receive the data or control signal. A DTE device sends data or control signals on one of the wires; a DCE device sends signals on the other wire.

For example, the TXD signal means data is transmitted by a DTE and received by a DCE and the RXD signal means data received by a DTE and transmitted by a DCE.

In general, terminals and printers are DTE while modems are DCE. However, there are many exceptions. If the device's owner's manual indicates with words or graphics that the TXD signal is "outgoing", the device is DTE; if it is "incoming", the device is DCE. The opposite is true for the RXD signal.

## To set the device 1. gender

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_MODE

where pp is the module position number from 1 to 12 and c is 1

2. Select the gender opposite to that of the data device connected to the circuit:

DTE or DCE

The softkey that does not appear is already selected.

## F3.5 Duplex Method

Data circuits support two duplex modes:

□ half-duplex (HALF\_DPLX)

☐ full-duplex (FULL\_DPLX)

Default: full-duplex (FULL\_DPLX)

Half-duplex transmission uses a single transmission path. Two connected devices can transmit and receive, but not at the same time.

Full-duplex transmission uses two independent transmission paths, one in each direction. This allows two connected devices to transmit and receive data simultaneously.

**X.21 circuits:** The duplex method, either half-duplex or full-duplex, is not configurable for X.21 DCMs, it is set to full-duplex automatically.

**V.35 circuits:** The duplex method is configurable for V.35 DCMs. But the duplex method is automatically changed when a circuit is configured for a multi-drop data bridge (see section F3.10, "Multi-drop Data Bridge", in this chapter).

## To set the duplex 1. method

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_MODE

where pp is the module position number from 1 to 12 and c is 1

Select the duplex mode of the data device connected directly to the data circuit:

HALF\_DPLX or FULL\_DPLX

The softkey that does not appear is already selected.

## F3.6 RTS/CTS Delay

Control signals Request To Send (RTS) and Clear To Send (CTS) regulate the direction of data flow on half-duplex lines. When one device wants to send a message to another, it asserts RTS. The modem connected to this device asserts CTS after a time delay. This time delay must be long enough to allow for the line to be cleared of any messages coming into the device. The time delay is called RTS/CTS delay.

For example, the RTS/CTS delay is used in multi-drop data bridges to make a slave device wait long enough to guarantee a transmission path has been established to the master device. An RTS/CTS delay that is too short results in messages being lost on the line. A delay that is too long decreases response time. The optimum value depends on your network.

**V.35 circuits:** The range for RTS/CTS delay is 0 to 160 milliseconds in 10 millisecond increments. You specify the delay in tens of milliseconds from 0 to 16 where, for example, 0 is 0 milliseconds, 2 is 20 milliseconds, 16 is 160 milliseconds.

For the circuit on the V.35 DCM, the RTS/CTS delay is only configurable if, first, the circuit is configured as a half-duplex (see section F3.5, "Duplex Method", in this chapter). The RTS/CTS softkey appears after the circuit has been configured as half-duplex.

X.21 circuits: The RTS/CTS delay does not apply to X.21 circuits.

Default: 0 milliseconds (0)

The actual RTS to CTS delay time may be up to 5 milliseconds longer than the configured delay time. This delay is in addition to any transmission delay (which may be up to 500 milliseconds for satellite links).

# To set the RTS/CTS delay

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_MODE RTS/CTS

where pp is the module position number from 1 to 12 and c is 1

The RTS/CTS softkey appears after the circuit has been configured as half-duplex.

The system prompts you to enter the length of the RTS/CTS delay.

2. Enter the RTS/CTS delay:

<time> <Return>

where the range is 0 to 160 milliseconds in 20 millisecond increments

## F3.7 Control Signals

Control signals provide the handshaking required for call set up, clearing calls, and synchronization.

X.21 circuits: The control signals that can be configured, are:

☐ Control Signal (C)☐ Indicator Signal (I)

V.35 circuits: The control signals that can be configured, are:

- Request To Send (RTS)
- ☐ Analog Loopback (ALB)
- □ Data Carrier Detect (DCD)
- Clear To Send (CTS)

Table F3-1 shows the control leads, with the default settings, that are applicable to the operating mode of the X.21 and V.35 DCMs. If the device is configured as synchronous, DTR and DSR are not functional for V.35 DCMs.

Control signals can be configured as:

- □ high (ON)
- low (OFF)
- end to end (END\_TO\_END)

Table F3-1: Control Leads for the X.21 and V.35 DCMs

Module	odule Operating Mode		Default	Outputs	Default	
X.21	DTE	1	END_TO_END	С	END_TO_END	
	DCE	С	END_TO_END	1	END_TO_END	
V.35	V.35 DTE		END_TO_END	RTS ALB	END_TO_END END_TO_END	
	DCE	RTS	END_TO_END	DCD CTS	END_TO_END END_TO_END	

When the control signals are configured as end-to-end, the state of the local signal follows that of the signal source at the remote end of the network. This option is only available if HCM rate adaption is selected.



NOTE: Control signals are the only interface parameter that can be set for a circuit configured as a timing source. Control signals can be changed if a circuit is cross-connected.

# To configure the 1. control signals

#### Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION CTRL\_LEADS

where pp is the module position number from 1 to 12 and c is 1

#### 2. Select:

INPUTS or OUTPUTS

On the NMTI display, the inputs signals are listed in the left column. The outputs are listed in the right column.

3. Select the control lead:

DCD or CTS or ALB or RTS or I or C

4. Select the status:

ON or OFF or END\_TO\_END

The softkey that does not appear is already selected.

## F3.8 Data Structure (Asynchronous only)

Three characteristics of asynchronous data, that is sent by the data device, can be configured:.

- character length
- number of stop bits
- type of parity



NOTE: The sum of the start bit (always 1), the character length (5, 6, 7 or 8), the stop bits (1 or 2) and the parity (0 for no parity or 1 for odd, even, mark or space) must equal 8, 9, 10 or 11. For example, if the character length is set to 5 bits and the number of stop bits is set to 1, the parity can not be set to NONE. If this rule would be broken by a selection the relevant softkeys are not displayed.

Character length Character length is the number of data bits used to transmit a character in asynchronous transmission. It can be set to:

- 5 bits (5\_BITS)
- 6 bits (6\_BITS)
- 7 bits (7\_BITS)
- 8 bits (8\_BITS)

Default: 8 bits (8\_BITS)

#### To set the character length

1. Enter:

> CONFIG CIRCUIT <pp-c> <Return> FUNCTION CHAR\_LEN where pp is the module position number from 1 to 12 and c is 1

2. Select the number of bits in a character used by the attached device:

5\_BITS or 6\_BITS or 7\_BITS or 8\_BITS

The softkey that does not appear is already selected.

#### Stop bits

Stop bits signify the end of a character in asynchronous transmission. The 3624 supports the following stop bit formats:

- 1 bit (1\_BIT)
- 2 bits (2\_BITS

Default: 1 bit (1\_BIT)

#### To set the number of stop bits

1. Enter:

> CONFIG CIRCUIT <pp-c> <Return> FUNCTION STOP\_BITS where pp is the module position number from 1 to 12 and c is 1

Set the number of stop bits used by the attached device, select:

1\_BIT or 2\_BITS

The softkey that does not appear is already selected.

#### Parity

Parity is an error detection method that adds an extra bit to each transmitted character. It is based on the number of 0s or 1s in each character.

The 3624 supports five parity schemes:

- no parity (NONE)
- odd (ODD)
- even (EVEN)
- □ mark (MARK)
- space (SPACE)

Default: no parity (NONE)

#### To set the parity 1.

. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION PARITY

where pp is the module position number from 1 to 12 and c is 1

2. Select the parity scheme used by the attached device:

NONE or ODD or EVEN or MARK or SPACE

The softkey that does not appear is already selected.

## F3.9 Clocking (Synchronous only)

Synchronous data devices require two timing sources: one for "receive data" and one for "transmit data". The timing source for the receive data is called the receive clock; the timing source for the transmit data is called the transmit clock. Notice that "transmit" and "receive" are defined relative to the data device configured as Data Terminal Equipment (DTE). That is, DTE devices use the transmit clock to transmit data and DCE devices use it to receive data. See Figure F3-1.

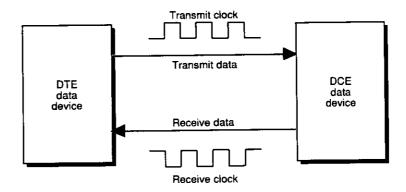


Figure F3-1: Transmit and Receive Clocks

Transmit clock	The source of the transmit clock between the data circuit and the attached local device can be set. The transmit clock can be supplied by:						
	the attached device (external clock) the data circuit to which the device is attached (internal clock) a remote source (slave clock)						
	The parameter setting is different depending on whether the circuit is in DCE or DTE mode.						
	V.35 Circuits: When the device mode is synchronous, the clocking source is selected between V.35 DCM and the attached data device.						
	For DCE circuits, the option is:						
	the transmit clock is provided by a Baud Rate Generator on the DCM, which is locked to the system timing (INTERNAL)						
	For the DTE circuits, the options are:						
	the transmit clock is extracted from the data stream (SLAVE); the transmit clock is provided by the user equipment (EXTERNAL); or the transmit clock is provided by a Baud Rate Generator on the DCM, which is locked to the system timing (INTERNAL).						
	X.21 Circuits: When the device mode is synchronous, the clocking source is selected between the X.21 DCM and the attached data device.						
	For DCE and DTE circuits, the option is:						
	the transmit clock is extracted from the data stream (SLAVE)						
	For both the X.21 and V.35 DCMs, the clock also can be set:						
	to the timing of the 3624 (LOCKED), or to be passed through transparently (INDEPNT).						
	Default: SLAVE LOCKED						
	If the clocking for a circuit is independent, the clocking information is						

If the clocking for a circuit is independent, the clocking information is embedded in the signalling bit of an HCM frame and passed through transparently. Deviations of up to 50 b/s relative to the nominal rate can be accommodated.

For more information, ask your Newbridge representative for Configuration Note NCN305, entitled "Data Interface Clocking".

F3-10 F. Data Modules

## To configure the 1. transmit clock

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION CLOCKING

where pp is the module position number from 1 to 12 and c is 1

2. Enter the source of the transmit clock available for the device gender:

INTERNAL or SLAVE or EXTERNAL

The softkey that does not appear is already selected.

3. Select:

LOCKED or INDEPNT

The softkey that does not appear is already selected.



NOTE: The INTERNAL softkey is not available if transparent or DDS rate adaption is selected.

## F3.10 Multi-drop Data Bridge

In a multi-drop data bridge, two or more circuits take turns using the same bandwidth to communicate with another circuit. For example, several terminals may take turns communicating with a computer. The one circuit that all the other circuits communicate with (e.g., the circuit connected to the computer) is designated the master; the remaining circuits (e.g., connected to terminals) are designated slaves. See Figure F3-2.

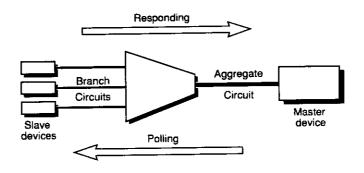


Figure F3-2: Multi-drop Data Bridge

The master device controls the shared bandwidth by polling the slave devices one after the other, asking each if it has data to send to the master. Only one slave may transmit at a time.

If, for example, your 3624 MainStreet is part of a network that includes a 3600 MainStreet Bandwidth Manager, you can configure 3624 circuits for a multidrop data bridge.

X.21 circuits: Multi-drop data bridge does not apply to X.21 circuits.

V.35 Circuits: Each data circuit is designated as one of the following:

L	master (MASTER)
ב	slave (SLAVE)
J	not part of a multi-drop data bridge (DISABLE)

Default: not part of a multi-drop data bridge (DISABLE)

One circuit in a multi-drop data bridge must be designated the "master". The 3624 automatically changes the configuration of the circuit to full-duplex and turns signalling off if HCM rate adaption is used. (See Chapter G2, HCM Rate Adaption, in this manual for information on signalling.)

All other circuits in the multi-drop data bridge are designated "slave". The 3624 automatically changes the configuration of the circuit to half-duplex and turns signalling off.

The data on each circuit must occupy the same amount of bandwidth with the same starting data position. Each slave device transmits data in that bandwidth at a different time. The master device sends its polling messages and looks for data from the slave devices in that bandwidth. See the chapter on the selected type of rate adaption (Chapter G1, Transparent Rate Adaption, Chapter G2, HCM Rate Adaption, or Chapter G3, DDS Rate Adaption, in this manual) for setting the data position.

If the circuit is configured as gender DCE, the DCD control signal must be forced on. If the circuit is configured as DTE, the RTS control signal must be forced on. See section F3.7, "Control Signals", in this chapter, to set the control signals.

The copy adjust function must not be used when configuring circuits that are part of the same multi-drop data bridge.

F3-12 F. Data Modules

# To configure a master or slave device

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_MODE MULTIDROP

where pp is the module position number from 1 to 12 and c is 1

#### 2. Select:

MASTER or SLAVE

The softkey that does not appear is already selected.

# To remove a master or slave device

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_MODE MULTIDROP DISABLE

where pp is the module position number from 1 to 12 and c is 1

If the DISABLE softkey does not appear, the multi-drop data bridge is already disabled.

## F3.11 Overview of Super-rate Circuits

Super-rate circuits are circuits that allow interface speeds up to 1344 kb/s. This section describes configuring the module positions, setting the interface speed and making the circuit cross-connections.



NOTE: The super-rate speeds are supported on V.35 and X.21 DCMs only when the circuits are configured for transparent rate adaption.

Sub-rate circuits are circuits that allow interface speeds of 64 kb/s and below. Sub-rate interface speeds are selected by changing the transport bandwidth (TRANSP\_BW) as described in Chapter G1, Transparent Rate Adaption, in this manual.

Super-rate circuit connections only can be made between the V.35 or X.21 DCM circuits and the circuits (channels) on the T1 link. The connections involve connecting more than one input circuit to more than one output circuit. (Subrate circuit connections involve only one DCM circuit and only one T1 circuit.) The T1 circuits that are part of the same super-rate group must be contiguous, that is, the T1 circuits must be sequential.

These super-rate connections are supported on the 3624 MainStreet but with some restrictions. These restrictions occur because of a cross-connection delay between certain input circuits on the 3624 and the output circuits on the T1 link.

One module position is required for each two T1 circuits. For example, if six T1 circuits are required, three module positions are needed. The DCM is installed in the first valid module position on the Universal Interface card and two blank modules are installed in the next two module positions. See Chapter 7, Installing the Interface Modules, in the Installation manual, for more information on installing the blank modules.

The installed blank modules prevent the installation of another interface module type into a module position (on the Interface card) that is being used for a super-rate connection.

## F3.12 Module Position Configuration

Both V.35 and X.21 DCMs are configured as described in Chapter C1, Module Position Configuration, in this manual.

Once the module position is configured and the interface speed is set for superrate (as described below), the additional positions required by the DCM are entered automatically as "RESERVED" as shown in Figure F3-3. A name can be entered for each position configured as "RESERVED".

3624	MainStreet	6207-ab-cd		Alarms	:0 14	1-APR-91	1:40P
#	Configured	Installed	Status	Name	Option	ns	
M01	V35_DCM	V35_DCM	Ok				
M02	RESERVED	Empty	Empty				
M03	RESERVED	Empty	Empty				
M04	RESERVED	Empty	Empty				
M05	Empty	Empty	Empty				
M06	Empty	Empty	Empty				
M07	Empty	Empty	Empty				
80M	Empty	Empty	Empty				
M09	Empty	Empty	Empty				
M10	Empty	Empty	Empty				
M11	Empty	Empty	Empty				
M12	Empty	Empty	Empty				
<b>r</b> 1	T1	Т1	00S		JB7 D4	No Inter	face
DSP	DDS	DDS	Ok				
CONE	FIG POSITION	#35#					
1-		2-	3-CONFIG_A	LL 4-		5-	
6-5	SHOW_ALL	7-	8-CANCEL	9-0	TIUC	0-	

Figure F3-3: Module Positions Configured as Reserved

A blank module should be installed on the Universal Interface card for each "RESERVED" module position used for super-rate connections. This prevents the accidental insertion of another module in the reserved position(s). Each time the interface speed is changed, the module position is updated, that is the "Configured" column changes to "Empty" if the super-rate circuit is no longer used.

If you attempt to configure a "RESERVED" module position, the error message, "Cannot configure, position is reserved by Mxx" (where xx stands for the installed DCM module position number), is displayed. For example, if you attempted to configure position M02, the error message, "Cannot configure, position is reserved by M01".

If you inadvertently place another interface module in a reserved position reserved for super-rate circuit, an alarm "Wrong Module in Position" is raised and defaulted to the major alarm queue. The status (under the "Status" column) of the "RESERVED" module position changes to "Wrong Module". When the interfering module is removed, the status returns to "OK".

Also the circuit status of the DCM is changed to "Out of Service". This status change indicates that the super-rate module cannot operate as configured. When the interfering module is removed the status returns to "OK".

If the super-rate circuits already have been connected to the T1 circuits, not only is the status changed to "Out of Service" but the connection is removed by the system to prevent any hardware damage. The alarm, "Super-rate conn removed: MxxMyy", is raised and defaulted to the major alarm queue. (Mxx indicates the DCM position number and Myy indicates the number of the first reserved module position.) This alarm indicates that the incorrect module insertion has caused the circuit to be disconnected.

## F3.13 Setting the Super-rate Interface Speed

Super-rate interface speeds are only available in transparent rate adaption and include speeds up tp 1344 kb/s. The selected super-rate speed, for the circuit, must be a multiple of the selected transport bandwidth. For example, if the transport bandwidth of a circuit is 40 kb/s, the data rate that can be entered is 80, 120, 160, up to 840 kb/s. See Table F3-2.

The selected speed also determines the number of circuits required on the T1 link and how many module positions are required to support that speed.

To determine the number of T1 circuits required, use the following calculation:

<u>data speed</u> = n transport bandwidth

where the transport bandwidth is the bandwidth used in each T1 circuit and "n" is a whole number between 1 and 21 and represents the 64 kb/s channel on the T1 link.

F. Data Modules

For example, if you wanted a data speed of  $400 \, \mathrm{kb/s}$ , using the  $40 \, \mathrm{kb/s}$  transport bandwidth, "n" = 10. Therefore, ten T1 circuits are required for the circuit connections. As well, from Table F3-2, five contiguous module positions are required on the Interface card. One module position is required for the X.21 or V.35 DCM and the other four module positions are required for blank modules.

Table F3-2: Super-rate Speeds, Required T1 Circuits and Module Positions

	Circuit Transport Bandwidth								T1	Module
		<u> </u>		(k	b/s)				Circuits	Positions
	8	16	24	32	40	48	56	64	Required	Required
	16	32	48	64	80	96	112	128	2	1
ŀ	24	48	72	96	120	144	168	192	3	2
	32	64	96	128	160	192	224	256	4	2
-	40	80	120	160	200	240	280	320	5	3
1	48	96	144	192	240	288	336	384	6	3
	56	112	168	224	280	336	392	448	7	4
1	64	128	192	256	320	384	448	512	8	4
	72	144	216	288	360	432	504	576	9	5
	80	160	240	320	400	480	560	640	10	5
	88	176	264	352	440	528	616	704	11	6
Speed	96	192	288	384	480	576	672	768	12	6
(kb/s)	104	208	312	416	520	624	728	832	13	7
	112	224	336	448	560	672	784	896	14	7
	120	240	360	480	600	720	840	960	15	8
İ	128	256	384	512	640	768	896	1024	16	8
}	136	272	408	544	680	816	952	1088	17	9
	144	288	432	576	720	864	1008	1152	18	9
	152	304	456	608	760	912	1064	1216	19	10
1	160	320	480	640	800	960	1120	1280	20	10
	168	336	504	672	840	1008	1176	1344	21	11

The system calculates the number of additional module positions needed when a valid speed is entered and configures the additional module positions as "RESERVED". The system also determines the number of circuits required on the T1 link to support that speed.



NOTE: The I/F\_SPEED softkey appears only when transparent rate adaption mode has been selected and X.21 or V.35 DCMs are being configured for super-rate interface speeds.

# To set super-rate 1. speeds

### 1. Enter:

CONFIG CIRCUIT <pp-c> Return> FUNCTION RATE\_ADAPT I/F\_SPEED

where pp is the position number of the DCM and c is 1



NOTE: If the circuit is already connected, the I/F\_SPEED cannot be changed.

The NMTI prompts for an interface speed as shown in Figure F3-4.

```
08-MAY-91
                                                                                                                                                                                                                                                                                                                                                                                                                                                             09:03A
                                                                                                                                                                                                                                                                                                    Alarms:2
                                                                                                            6207-ab-cd
3624 MainStreet
                                   DATA CCT: M01-01 NAME:
                                                                                                                                                                                                        Configured As : SYNC - DCE - FULL DUPLEX
                       B7 B6 B5 B4 B3 B2 B1 B0
                                                                                                                                                                                                         Rate Adaption : TRANSPARENT - 48 Kbps
Transport Posn : B7
                               \begin{picture}(100,0)(0,0) \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}} \put(0,0){\line(0,0){10}}
                                                                                                                                                                                                          Interface Speed: 720 Kbps
                                                                                                                                                                                                          Data Position : NA
                                                                                                                                                                                                                                                                                              : NA
                                                                                                                                                                                                          Signalling
                                                                                                                                                                                                                                                                                                        : DISABLED
                                                                                                                                                                                                          Multi-Drop
                                                                                                                                                                                                                                                                                                           : SLAVE - LOCKED
                                                                                                                                                                                                          Clock
                  D - DATA
       CONFIG CIRCUIT 1-1 FUNCTION RATE_ADAPT I/F_SPEED ' . . '
         Enter interface super-rate speed in Kbps.
                                                                                                                                                                                                                                                                                                                                                                                                                     5-
              1 -
                                                                                                                                                                                                                                                                                                                   9-QUIT
```

Figure F3-4: Screen Display of Super-rate Speeds

## Enter the desired interface speed:

<speed> <Return>

where speed is the actual speed in kb/s

For example, if the selected speed is 720 kb/s, enter 720.

If the entered speed is not a multiple of the selected bandwidth or is higher than the maximum speed, an error message "Invalid speed" is displayed. If there are not enough additional module positions available, the entered speed is not accepted and an error message, "Not enough additional positions available to support I/F\_Speed", is displayed.

## F3.14 Making Cross-Connections

Super-rate circuit connections are made between the V.35 or X.21 DCM circuits and the circuits of the T1 link. The connections involve connecting more than one input circuit to more than one output circuit. The circuits must be contiguous.

# Using a given module position

Table F3-3 is used to determine the valid T1 circuit connections for the number of T1 circuits required when a DCM is installed in a given module position.

The arrow (→) indicates that all circuits between, and including, the two values are valid as a starting circuit. A value, without a range, is also a valid starting position. A combination of a module position and the number of T1 circuits that falls on a blank space is not valid and is marked with a blank line (–).

Table F3-3: Valid T1 Circuit Connections

Number	Installed Module Position Number							
of T1	1	2	3	4	5	6		
Circuits	Valid Starting T1 Circuit Connection							
2	14→23	15→23	15→23	1,16→23	1,2,17→23	1→3,18→23		
3	13→22	14→22	14→22	1,15→22	1,2,16→22	1,2,17→22		
4	13→21	14→21	14→21	1,15→21	1,2,16→21	1,2,17→21		
5	12→20	13→20	13→20	1,14→20	1,15→20	1,2,16→20		
6	12→19	13→19	13→19	1,14 <del>-)</del> 19	1,15-€19	1,2,16→19		
7	11→18	12→18	12→18	13→18	1,14→18	1,2,15→18		
8	11→17	12→17	12→17	13→17	1,14→17	1,2,15→17		
9	10→16	11→16	11→16	12→16	1,13→16	1,2,14→16		
10	10→15	11→15	11→15	12→15	1,13→15	1,2,14,15		
11	9→14	10→14	10→14	11→14	1,12→14	1,13,14		
12	9→13	10→13	10→13	11→13	1,12,13	1,13		
13	8→12	9→12	9→12	10→12	11,12	1,12		
14	8→11	9→11	9 <del>→</del> 11	10,11	11	1		
15	7→10	8→10	9→10	9,10	10	-		
16	7 <b>→</b> 9	8, 9	8, 9	9	_	_		
17	6→8	7, 8	7,8	8	_	_		
18	6, 7	7	7		_			
19	5, 6	6	6	_	_	_		
20	5	_	_	-	_	_		
21	4	-	_	_	_	continued		

Table F3-3: Valid T1 Circuit Connections (continued)

Number	Installed Module Position Number						
of T1	7	8	9	10	11	12	
Circuits		nection					
2	1→3,18→23	1→4,19→23	1→5, 20→23	1→6, 21→23	1→6,21→23	1 <b>→</b> 7, 22, 23	
3	1→3,17→22	1→4,18→22	1→5,19→22	1→5, 20→22	1→6, 20→22		
4	1→3,17→21	1→4,18→21	1→5,19→21	1→5, 20, 21	1→6, 20, 21	_	
5	1→3,16→20	1→4,17→20	1→4,18→20	1→5,19, 20	_	_	
6	1→3,16→19	1→4,17→19	1→4,18,19	1->5,19	_	-	
7	1→3,15→18	1→3,16→18	1→4,17,18	_	_	-	
8	1→3,15→17	1→3,16,17	1→4,17		-		
9	1,2,14→16	1->3,15,16	_	_	_		
10	1,2,14,15	1→3,15	_		_		
11	1,2,13,14	_	-	_	_	-	
12	1,2,13	_	_	_			
13	_	_	_	_	-		
14	_	_	_				
15	_	_			_	<u> </u>	
16	_	_		_	_		
17	_	_					
18	_	_	_	-	_		
19	_	_					
20	_		_	-		_	
21	_	_	_	_	_		

The following three examples illustrate how Table F3-3 is used to determine the valid starting T1 circuit connection.

If you require seven T1 circuits and have installed the DCM in module position 4, the valid starting T1 circuit connections are 13, 14, 15, 16, 17, or 18.

If you require seventeen T1 circuits and have installed the DCM in module position 2, the valid starting T1 circuit connections are 7 or 8.

If you require nine T1 channels and have installed the DCM in module position 9, you have to re-arrange your modules because you are unable to use this combination.

## Using a given T1 circuit

Table F3-4 is used to determine the valid module positions for the number of T1 circuits required when a given T1 circuit is to be used. The arrow  $(\rightarrow)$  indicates that all module position between, and including, the two values are valid as a starting module position. A value, without a range, is a valid starting position. A combination of a module position and the number of T1 circuits that falls on a blank space is not valid and is marked with a blank line (-).

The following example illustrate the use of Table F3-4.

If the starting T1 circuit is number 5 and you require four T1 circuits, you could insert the DCM into module positions  $9\rightarrow11$ , that is, you could use position 9, 10 or 11.

If the starting T1 circuit is number 9 and you require eleven T1 circuits, you would insert the DCM into module position 1.

If the starting T1 circuit is number 12 and you require three T1 circuits, you could not use this combination as a valid option.

Starting T1 Circuit Numbers Number of T1 1 2 3 4 10 11 12 Circuits Valid Module Positions Required 4→12 5-≯12 6→12 8→12 9→12 10→12 3 4→11 5→11 7→11 11 4→11 4 5→11 7→11 8→11 9→11 11 5 4→10 6->10 7→10 8→10 10 1 6 4→10 6→10 7→10 8→10 1 7 5→9 6->9 7→9 9 1→3 8 5→9 6→9 7->9 9 1 1→3 9 5→8 6→8 8 1 1->3 1-4 10 5→8 6→8 8 1→3 1→4 11 5->7 1 1->3 1→4 1→5 12 5→7 7 1→3 1 1-->4 1→5 13 6 1 1→3 1→4 1→5 1→6 14 6 1 1→3 1→4 1**→**5 15 1→3 1 1-34 1→5 \_\_ 16 1 1->3 1→4 17 1 1→3 1→4 18 1 1-3 19 1 1->3 20 1 \_ 21 1 con't

Table F3-4: Valid Module Positions

Starting T1 Circuit Numbers Number 24 20 21 22 23 19 18 17 of T1 13 14 15 16 Valid Module Positions Circuits Required All 1→5 1→7 1→8 1→9 All 1→4 1→3 1->11 1→11 1→7 1→11 1→3 1→4 1→5 1→8 1→9 1 3 1→8 1→9 1->11 1→4 1→5 1→7 1 1→3 4 1→9 1→10 1→10 1→8 1->3 1→4 1→5 1→7 5 1→7 1→8 1→9 1→10 1→4 1→5 1->3 6 1→8 1→9 1→9 1→7 7 1-≯4 1->5 1→9 1→5 1->7 1-≯8 8 1→4 1→8 1→7 1→8 1→5 1→7 1->8 1→5 10 \_ 1→7 11 1-->7 12 13 14 \_ 15 16 17 18 19 20 21

Table F3-4: Valid Module Positions (continued)

circuits

To cross-connect A single cross-connection makes the connection between the DCM and the contiguous T1 circuits.

#### Enter:

CONFIG CONNECT <pp-c> <Return>

where pp is the module position number where the DCM is installed and *c* is 1

#### Select: 2.

TO\_CIRCUIT

The NMTI prompts you for the second circuit identifier.

#### 3. Enter:

<T1-cc> <Return>

where T1-cc is the first valid T1 circuit number in the contiguous group

The successive circuit cross-connections are made automatically. For example, if four circuits are needed and T1-05 is the starting circuit, enter <T1-05>. T1-05 to T1-08, inclusive, are automatically connected.



NOTE: No connection is made to a V.35 or X.21 DCM circuit that is configured for super-rate when "CONFIG CONNECT\_ALL" is selected.

Figure F3-5 shows an example of the SHOW\_GROUP display screen where T1-05 to T1-08 are connected to M05-01.

3624 Mains	treet	6207-ab-cd		Alarms:2	14-APR-91	10:19A
Circuit	Name	Туре	Circuit	Name	Туре	
T1 -01		*T1_RS232_DCM	M01-01		RS232_DCM	
T1 -02		T1_SIG			_	
т1 -03		T1_SIG				
T1 -04		T1_SIG				
T1 -05		*T1_V35_DCM	M05-01		V35_DCM	
T1 -06		*T1_V35_DCM	M05-01		V35_DCM	
T1 -07		*T1_V35_DCM	M05-01		V35_DCM	
T1 -08		*T1_V35_DCM	M05-01		V35_DCM	
T1 -09		T1_SIG				
T1 -10		T1_SIG				
T1 -11		T1_SIG				
T1 -12		T1_SIG				
Asterisk	s indic	ate current con	nections.			
CONFIG CO	NNECT T	1-1				
1-SHOW_C	CT	2-DISCONNECT	3-TO CIRCUIT	4-	5-	
6-		7-	8-CANCEL	9-OUIT	0-	

Figure F3-5: Super-rate Connections

Table F3-5 lists the error or warning messages that are displayed if there is a problem with the requested circuit connections.

Table F3-5: Messages for Incorrect Super-rate Connections

Message	Reason for Message
Couldn't make connection: insufficient bandwidth	The super-rate group extends beyond circuit 24.
Cannot connect: Overlapping existing connection	One of the T1 circuits is already connected in a sub-rate connection or connected as a part of a super-rate connection.
Circuit is in the middle of a super-rate group	The entered T1 circuit is in the middle of a super-rate group. You must enter another circuit number.
Cannot cross-connect selected super-rate circuits	The circuits cannot be connected because of a delay equalization problem through the DX chip.

# Disconnecting a super-rate circuit

Super-rate circuits are disconnected by entering circuit number of the installed V.35 or X.21 DCM or by entering the first T1 circuit number of the super-rate group that was used to make the connection. See section C3.4, "Disconnecting Circuits", in this manual for the procedure on disconnecting circuits.

If the T1 circuit number that is entered is not the first circuit in the group, the following error message, :Circuit is in the middle of a super-rate group:, is displayed.



NOTE: Selecting "CONFIG DISCON\_ALL" removes all connections including super-rate connections.



## F4. The OCU Module

This chapter describes the Office Channel Unit (OCU) module. It includes:

a description of the module setting the data circuit operating parameters

#### F4.1 The OCU Modules

The OCU module is a dual circuit module that is available in two variants, for installation on the Universal Interface card on the 3624. The two variants are identified by part number. The two variants are:

☐ OCU I (90-0693-01)

The OCU I (90-0693-01) module is used to provide an interface between the customer's local loop and the DDS network through the T1 link. This module does not support switched 56 data service operation.

□ OCU II (90-0693-02)

The OCU II (90-0693-02) module is used to provide an interface between the customer's local loop and the DDS network through the T1 link. It supports switched 56 data service on the T1 link.

The two variants do **not** have the same pin/signal assignment; therefore, they are not interchangeable on the Universal Interface card. If a module position is configured for one module variant and the other module variant is installed, a "Wrong Module" alarm is generated. See Chapter 9, Connecting to External Voice and Data Circuits, in the Installation Manual for the pin/signal assignments.

A DDS module is not required on the 3624 to support the features of the OCU modules.

F. Data Modules

### F4.2 About Data Operating Parameters

Before any of the procedures in this chapter can be implemented you must:

- configure the module positions for the appropriate data modules
- ☐ know the operating characteristics of the data device connected directly or indirectly to each circuit

When you configure a module position, the circuits on the module in that position are automatically configured with default settings and can be cross-connected. If you try to modify or cross-connect circuits on an unconfigured module position, the NMTI displays an error message.

The configuration parameters for the OCU modules are:

- ☐ interface speed
- ☐ fault signalling
- switched 56 data service

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.



NOTE: The procedures in this chapter use the FUNCTION softkey. This softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

## F4.3 Interface Speed

The interface speed is the rate at which the device is transmitting data. The speeds supported for the OCU modules are:

- □ 2400 b/s (2400)
- □ 4800 b/s (4800)
- 9600 b/s (9600)
- □ 56000 b/s (56000)

Default: 9600 b/s (9600)

If you want switched 56 data service on a circuit for OCU II (90-0693-02), you must set the interface speed to 56000 b/s **before** setting the switched 56 data service. When switched 56 data service is configured, the l/F\_SPEED softkey is not displayed for that circuit.

# To configure the 1. interface speed

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION I/F\_SPEED

where pp is the module position number from 1 to 12 and c is 1 or 2

#### 2. Select:

2400 or 4800 or 9600 or 56000

The softkey that does not appear is already selected.

### F4.4 Switched 56 Data Service

Switched 56 data service from a carrier service can be enabled. The attached equipment provides the dialing, originating and answer control.

Switched 56 data service can be:

- enabled (SW56\_ON)
- ☐ disabled (SW56\_OFF)

Default: disabled (SW56\_OFF)

For OCU I (90-0693-01), which does not support switched 56 data service, the SW56\_ON/SW56\_OFF softkey does not appear.

The interface speed for OCU II variant (90-0693-02) must be set to 56 kb/s prior to setting switched 56 data service.

When an OCU II (90-0693-02) circuit, set for switched 56 data service, is connected to a T1 circuit, robbed bit signalling is automatically enabled (RBS\_ON).

# To set switched 56 data service

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION

where pp is the module position number from 1 to 12 and c is 1 or 2

#### 2. Select:

SW56\_ON or SW56\_OFF

The SW56\_ON/SW56\_OFF softkey is a toggle softkey; the softkey that does not appear is already selected.

### F4.5 Fault Signalling

Fault signalling is the signalling condition the 3624 applies to the interface being configured if the equipment to which it is cross-connected is not available (that is, not physically present or out of synchronization).

The two types of fault signalling are:

- ¬ seized (SEIZED)
- ☐ idle (IDLE)

Default: idle (IDLE)

# To set fault signalling

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FAULT\_SIG

where pp is the module position number from 1 to 12 and c is 1 or 2

2. Select:

SEIZED or IDLE

The softkey that does not appear is already selected.



NOTE: Changing the fault signalling is permitted on the NMTI even if the circuit is cross-connected, but it does not take effect until the next circuit cross-connection.

# F5. The 4W TO Module

chapter describes the 4W TO (4 Wire Transmission Only) module. It udes:
a description of the module setting the voice circuit operating parameters

## F5.1 The 4W TO Module

The 4W TO module is used to pass analog modem signals over a 4-wire local loop. The 4W TO module can be installed in any position on the Universal Interface card on the 3624.

The module provides two circuits which offer different ranges of transmission level settings.

## F5.2 About Circuit Operating Parameters

When you configure a module position, the circuits on the module in that position are automatically configured with default settings and can be cross-connected. If you try to modify or cross-connect circuits on an unconfigured module position, the NMTI displays an error message.

The configuration parameter for the 4W TO module is:

☐ the Transmission Level Points (TLPs)

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.

F. Data Modules

#### F5.3 Transmission Level Points

The Transmission Level Point (TLP) specifies the receive and transmit levels (in decibels) of the signal from a voice circuit with respect to the digital trunk. The receive TLP refers to the digital-to-analog level (the difference between **a** and **b** in Figure F5-1) and the transmit TLP refers to the analog-to-digital level (the difference between **d** and **c** in Figure F5-1).

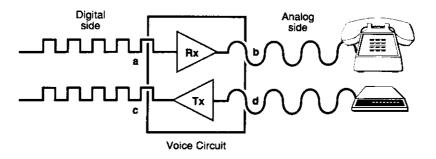


Figure F5-1: TLPs

TLPs use signals measured in dBm, which is the power of a measured signal relative to a reference signal of 1 milliwatt.

A TLP is measured with respect to 0 dBm on the digital side. 0 dBm is equal to 1 mW of power imposed upon an impedance of  $600\Omega$  at a frequency of 1004 Hz. 0 dBm on the digital side is the digital signal required to produce 0 dBm on the analog side of a standard digital-to-analog converter.

For example, a receive TLP of -3 means a digital input of 0 dBm produces an analog output of -3 dBm (see Figure F5-2). The higher the receive TLP, the "louder" the phone conversation sounds.

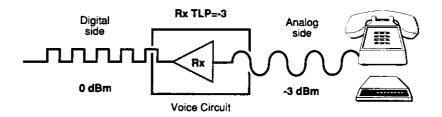


Figure F5-2: An Example of Receive TLPs

A transmit TLP of -3 means an analog signal of -3 dBm is needed to produce 0 dBm on the digital side (see Figure F5-3). The higher the transmit TLP, the "quieter" the phone conversation sounds for a given input signal level.

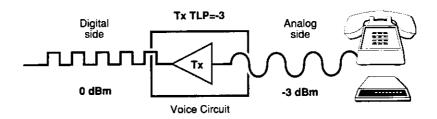


Figure F5-3: An Example of Transmit TLPs

#### TLP ranges

Table F5-1 lists the permissible RX TLP and TX TLP ranges, with the steps, for 4W TO circuits and gives the default settings.

Table F5-1: Permissible TLPs for 4W TO Circuits

TLP Range	Steps	Default
(dBm)	(dBm)	(dBm)
Rx: -8.5 to -7	0.5	-3.0
Tx: +9.0 to +16.5	0.5	+13.0

#### To set TLP

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> LEVELS

where pp is the module position number from 1 to 12 and c is 1 or 2

2a. To set the Rx TLP, enter:

RX\_TLP <TLP value> <Return>

where the TLP value is within the range and step value for the 4W TO module

2b. To set the Tx TLP, enter:

TX\_TLP <TLP value> <Return>

where the TLP value is within the range and step value for the 4W TO module

G. Rate Adaption

# G1. Transparent Rate Adaption

This	chapter describes transparent rate adaption, including:
J	configuring a circuit for transparent rate adaption configuring transport position configuring transport bandwidth

### G1.1 What is Rate Adaption?

The specifications for T1 define a framing structure that allocates the available bandwidth in 64 kb/s channels. This structure arose from the sampling rate of 8,000 8-bit samples per second required for digitizing one voice call.

Data devices often operate at rates well below 64 kb/s, but the framing structure for a T1 link does not specifically support these rates. Rate adaption allows sub-rate data devices to use a 64 kb/s channel. Rate adaption multiplexes data from devices transmitting at less than 64 kb/s onto a T1 channel.

The 3624 can perform three types of rate adaption:

<b></b>	transparent (TRANSPAREN)
コ	Newbridge's proprietary High Capacity Multiplexing (HCM)
	AT&T's Dataphone Digital Service (DDS)

Default: High Capacity Multiplexing (HCM)

Circuits that are a mixture of transparent and HCM rate adaption can be combined on one 64 kb/s channel. But a mixture is not possible with DDS rate adaption circuits.

DDS is only available if there is a DDS module on the Control card and if the DSP position is configured as DDS (see Chapter C1, Module Position Configuration, in this manual to configure the DDS module).

If the device mode for the data device is synchronous, any method of rate adaption can be used. If the device mode is asynchronous, only HCM or DDS can be used. (For information on configuring data circuit operating parameters, see the specific chapter on the data module in Volume F, Data Modules, of this manual.)

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.

### G1.2 Overview of Transparent Rate Adaption

A transparent channel carries data, signalling, and framing information from a device through the *3624* without adding any signalling or framing information. Transparent rate adaption supports synchronous data running at a rate that is a multiple of 8 kb/s. If a device is transmitting asynchronous data, transparent rate adaption cannot be used.

A 64 kb/s transparent channel is made up of eight 8 kb/s elements named B7 through B0. The NMTI represents the amount of bandwidth allocated to a transparent channel by the number of elements containing a D, where each D represents 8 kb/s of bandwidth. Elements that do not contain a D represent unused bandwidth. Figure G1-1 shows a 32 kb/s transparent channel as represented on the NMTI screen.

```
3624 MainStreet 6207-ab-cd
                                                Alarms:1
                                                           25-Apr-91
                                                                        9:32A
     DATA CCT: M01-01 NAME:
   B7 B6 B5 B4 B3 B2 B1 B0
                               Configured As : SYNC - DCE - FULL DUPLEX
                                 Rate Adaption : TRANSPARENT - 32 kbps
    D D D D
                                 Transport Posn : B7
                                 Interface Speed: NA
                                 Data Position : NA
                                 Sigmalling : NA
Multi-Drop : DISABLED
Clock : SLAVE - LOCKED
  D - DATA
CONFIG CIRCUIT 1-1 FUNCTION RATE_ADAPT
                  2-TRANSP_BW
                                  3-TRANSP_POS
  1-METHOD
                  7-
                                  8-CANCEL
                                                  9-OUIT
  6-
```

Figure G1-1: Transparent Channel

Two parameters can be set for transparent channels (described in the following sections):

- transport bandwidth
- transport position



NOTE: The FUNCTION softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

# To configure a data circuit for transparent rate adaption

#### Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION

where pp is the module position number from 1 to 12 and is either 1 or 2, or A or B depending upon the module type



NOTE: Transparent rate adaption cannot be selected if the circuit is set for asynchronous data.

#### 2. Select:

RATE\_ADAPT METHOD TRANSPAREN

The TRANSPAREN softkey is part of a softkey group; if it does not appear then transparent rate adaption is already selected.

# Copying circuit configuration

If you wish to assign the same configuration to other circuits, you can configure one circuit then copy its parameters (except the name and the connection) to the other circuits. The procedure for copying circuit configuration is described in Chapter C2, Circuit Numbering, Naming and Quick Configuration, in this manual.

For DNIC and DCM circuits configured for transparent rate adaption, you can copy the circuit configuration to another circuit by using the softkey, COPY\_ADJ. The data bits are placed in the next available elements. For example, using COPY\_ADJ from a transparent circuit configured for 16 kb/s with a transport position of B7 sets the transport position to B5 and copies the transport bandwidth to the new circuit.

### G1.3 Transport Bandwidth

The transport bandwidth is the bandwidth allocated to the data device. For transparent rate adaption, setting the transport bandwidth establishes a channel for a data device with an interface speed that is a multiple of 8 kb/s.



NOTE: Setting the transport bandwidth establishes both the amount of a 64 kb/s channel used and the sub-rate interface speed of the device.

On the NMTI screen, each element of a transparent channel represents 1 bit transmitted at a rate of 8,000 per second or 8 kb/s of bandwidth (1 bit  $\mathbf{x}$  8,000 per second = 8 kb/s). The transport bandwidth is set by entering the number of elements (1 through 8) available to the device. That is, the transport bandwidth equals the number of elements  $\mathbf{x}$  8 kb/s. Thus, you can establish an 8 kb/s channel by entering 1, a 16 kb/s channel by entering 2, etc.

The transport bandwidth is displayed on the NMTI screen by the number of Ds and is also listed on the right hand side of the screen under "Rate Adaption". See Figure G1-1.

The possible transport bandwidths for transparent circuits are:

 □
 8 kb/s (1)
 □
 40 kb/s (5)

 □
 16 kb/s (2)
 □
 48 kb/s (6)

 □
 24 kb/s/s (3)
 □
 56 kb/s (7)

 □
 32 kb/s (4)
 □
 64 kb/s (8)

Default: 64 kb/s (8)

For example, Figure G1-2a shows a transparent channel with a transport bandwidth of 16 kb/s (2 elements). Figure G1-2b shows a transparent channel with a transport bandwidth of 48 kb/s (6 elements) for which the transport position has been changed to B5 (see section G1-4, "Transport Position", in this chapter).

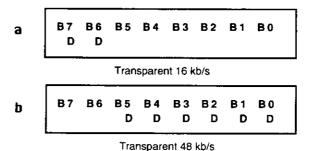


Figure G1-2: Transport Bandwidth Examples

# Pointers for setting transport bandwidth

If a transparent DCM or DNIC circuit is connected to a T1 channel that has jam bit 7 or robbed bit signalling enabled, the resulting loss of usable transport bandwidth must be considered. The jam bit 7 and robbed bit signalling are described in chapter D1, T1 Module Operating Parameters, in this manual.

Figure G1-3 shows the element numbering for a transparent channel and the corresponding bit numbering of a T1 channel.

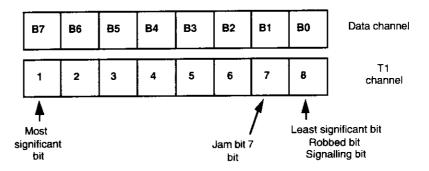


Figure G1-3: Bit Numbering Conventions

In the following examples it is assumed that the transport position is always B7 (described in section G1-4, "Transport Position" in this chapter).

These examples do not cover all possibilities. Rather, they illustrate the need to consider the effects of robbed bit signalling, jam bit 7 and binary 8 zero suppression on the usable bandwidth.

- ☐ If the transport bandwidth is 64 kb/s (8 elements), and the customer's data protocol ensures an adequate ones' density, jam bit 7 does not alter bit 7 (B1) if enabled.
- If the transport bandwidth of the channel is 56 kb/s (7 elements), the 3624 automatically sets bit 8 (B0) to 1, ensuring an adequate ones' density. Therefore, jam bit 7 does not alter bit 7 (B1) if enabled.
- ☐ The RTS control lead signal is transported over bit 8 (B0). If RTS goes "low", bit 8 (B0) is changed to 0. Therefore, to ensure ones density, you must configure RTS to be "high", that is, "ON" (see the specific chapter in Volume F, Data Modules, in this manual).
- ☐ If the customer's data protocol does not ensure an adequate ones' density and for some reason bit 8 (B0) is being altered (for example, by robbed bit signalling or RTS signalling), jam bit 7 may alter bit 7 (B1) and thus B1 is not available for data. The transport bandwidth must be 48 kb/s (6 elements) or less to prevent data errors.

☐ If a transparent circuit with a transport bandwidth of 64 kb/s (8 elements) is being connected to a T1 channel with robbed bit signalling enabled, the robbed bit signalling must be turned off or the bit 8 (B0) position not used (reduce the transport bandwidth to 56 kb/s (7 elements) or less). Selecting binary 8 zero suppression ensures an adequate ones density in the data stream and disabling robbed bit signalling allows the use of 64 kb/s of bandwidth.

# To set the transport bandwidth

#### Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION RATE\_ADAPT TRANSP BW

where *pp* is the module position number from 1 to 12 and is either 1 or 2, or A or B depending upon the module type

The system prompts you for the bandwidth.

2. Enter the bandwidth:

<*n*> <Return>

where n equals the number of 8 kb/s elements (1, 2, 3, 4, 5, 6, 7, or 8)

### **G1.4** Transport Position

When the transport bandwidth is set, the 3624 automatically starts with element B7 and fills to the right until the required bandwidth is allocated. The transport position allows you to redefine the starting element from the default of B7.

If you want to assign more than one sub-rate transparent channel to the same 64 kb/s channel (sub-rate multiplexing), you must arrange the starting elements and the transport bandwidth so that data from different devices does not occupy the same element.

If you want to configure a number of circuits as a multi-drop data bridge, you must arrange the starting elements and the transport bandwidth so that data from different devices does not occupy the same element.

Bn defines the starting element, where n is a number from 0 to 7. The transport position is displayed on the NMTI screen by the position of the leftmost D and is listed on the right side of the screen under "Transport Posn" (see Figure G1-1). For example, in Figure G1-2a, the transport position is B7; in Figure G1-2b, the transport position is B5.

Default: B7

Table G1-1 indicates the allowable transport positions as determined by the transport bandwidth.

Table G1-1: Transport Bandwidth vs Transport Position for Transparent Rate Adaption

Transport Bandwidth	Transport Position
64 kb/s (8 elements)	B7 only
56 kb/s (8 elements)	B6, or B7
48 kb/s (8 elements)	B5, B6, or B7
32 kb/s (8 elements)	B3, B4, B5, B6, or B7
16 kb/s (8 elements)	B1, B2, B3, B4, B5, B6, or B7
8 kb/s (8 elements)	B0, B1, B2, B3, B4, B5, B6, or B7



NOTE: The 3624 gives priority to transport position over transport bandwidth. Changing the transport position may change the transport bandwidth. If there are not enough elements to the right of the transport position, the NMTI reduces the transport bandwidth to the available amount, even if you have configured it for more. To increase the transport bandwidth, you may need to change the transport position first.

# To set the transport position

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION RATE\_ADAPT TRANSP\_POS

where *pp* is the module position number from 1 to 12 and is either 1 or 2, or A or B depending upon the module type

The system prompts you for the transport position.

2. Enter the starting element:

<Bn> <Return>

where Bn equals B7 through B0

		•

# G2. HCM Rate Adaption

This chapter describes High Capacity Multiplexing (HCM) rate adaption, including:

configuring a circuit for HCM rate adaption configuring the parameters for a HCM circuit

## **G2.1** What is Rate Adaption?

The specifications for T1 define a framing structure that allocates the available bandwidth in 64 kb/s channels. This structure arose from the sampling rate of 8,000 8-bit samples per second required for digitizing one voice call.

Data devices often operate at rates well below 64 kb/s, but the framing structure for a T1 link does not specifically support these rates. Rate adaption allows sub-rate data devices to use a 64 kb/s channel. Rate adaption multiplexes data from devices transmitting at less than 64 kb/s onto a T1 channel.

The 3624 can perform three types of rate adaption:

<ul> <li>transparent (TRANSPAREN)</li> <li>Newbridge's proprietary High Capacity Multiplexing (Head AT&amp;T's Dataphone Digital Service (DDS)</li> </ul>
---

Default: High Capacity Multiplexing (HCM)

Circuits that are a mixture of transparent and HCM rate adaption can be combined on one 64 kb/s channel. But a mixture is not possible with DDS rate adaption circuits.

If the device mode for the data device is synchronous, any method of rate adaption can be used. If the device mode is asynchronous, only HCM or DDS can be used. (For information on configuring data circuit operating parameters, see the specific chapter on the data module in Volume F of this manual.)

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.

### G2.2 Overview of HCM Rate Adaption

High Capacity Multiplexing (HCM) rate adaption is a proprietary rate adaption scheme developed by Newbridge so that users can establish data channels for a wider variety of interface speeds than is possible with other rate adaption techniques.

HCM rate adaption divides a 64 kb/s channel into 80 elements, which are transmitted at a rate of 800 elements per second. Each element (the character "D" in Figure G2-1) represents one bit and therefore 800 b/s of bandwidth.

The NMTI displays a HCM frame as a 10-row by 8-column matrix, as shown in Figure G2-1. The rows are named F0 to F9. The columns are named B7 to B0. An element is identified by its row and column, for example, F3-B2.

```
3624 MainStreet 6207-ab-cd
                                                                         Alarms:1 25-Apr-91 11:16A
          DATA CCT: M01-01 NAME:
 B/ Bb B5 B4 B3 B2 B1 B0 Configured As : SYNC - DCE - FULL DUPLEX
F0 F S D D D D D Rate Adaption : HCM - 64 Kbps
F1 D D D D D D - - Transport Posn : B7
F2 - - - - - - - - Interface Speed : 9600 bps
                                           Transport Posn : b/
Interface Speed : 9600 bps
Data Position : F0-B5
Signalling : ON
Multi-Drop : DISABLED
Clock : SLAVE - LOCKED
  F4
  F6
  Γ7
  F8
    D - DATA F - FRAMING BIT S - SIGNALING BIT
 CONFIG CIRCUIT 1-1 FUNCTION RATE_ADAPT
   1-METHOD
                           2-TRANSP_BW
                                                    3-TRANSP_POS
                                                                           4-SIG_OFF
                                                                                                    5-I/F_SPEED
   6-DATA POSN
                                                  8-CANCEL
                                                                           9-OUIT
```

Figure G2-1: HCM Frame

Elements containing a D represent the bandwidth allocated to a HCM channel, where each D represents 800 b/s of bandwidth.

Because the HCM frame pattern is independent of the primary rate framing pattern, the start of the HCM frame must be flagged. This is accomplished by a framing bit, which is indicated by an "F" in the illustration.

The "S" (in F0-B6 in the illustration) represents the bit position reserved for the signalling bit stream, which includes the clock adjustment if clocking is configured as independent. The Ds represent data from the data device.

The F and S each occupy one element. Any element that does not contain an F, S or D represents unused bandwidth.

# To configure a circuit for HCM rate adaption

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION

where pp is the module position number from 1 to 12 and c is 1 or 2, or A or B depending on the interface module that is being configured

#### 2. Select:

RATE\_ADAPT METHOD HCM

The HCM softkey is part of a softkey group; if it does not appear then HCM rate adaption is already selected.



NOTE: The FUNCTION softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

The five parameters that can be set for the HCM channels (described in the following sections) are:

	the transport bandwidth
<b>_</b>	the transport position
	the interface speed

the signalling bit

the data position

Not all of these parameters are applicable to both circuits of the 2606, 2608, and 2610 MainStreet DTUs. The transport bandwidth, the transport position and interface speed are relevant to the A circuit, which configures the aggregate port.

The interface speed is relevant to the B circuit, which configures the 8 asynchronous ports.

G. Rate Adaption

## G2.3 Transport Bandwidth

The transport bandwidth is the bandwidth allocated to the data device. For HCM rate adaption, setting the transport bandwidth does not establish the maximum allowable interface speed for the data device. The interface speed is set separately.

The default setting for transport bandwidth is 64 kb/s. You do not need to reduce the transport bandwidth unless the HCM channel is going to be:

sub-rate multiplexed with transparent channels
transported on a primary rate channel for which some of the bit
positions are not available for data, such as a T1 link that uses robbed
bit signalling

The transport bandwidth can be set in increments of 8 kb/s. It is set by entering the number of columns (1 through 8). Each column has ten 800 b/s elements and thus represents 8 kb/s of bandwidth. Therefore, the transport bandwidth equals the number of columns  $\mathbf{x}$  8 kb/s.

Default: 64 kb/s (8 columns)

The bandwidth is indicated by the number of columns containing characters; it is also listed to the right of the screen beside "Rate Adaption", see Figure G2-2. For example, in Figure G2-2, the transport bandwidth is 40 kb/s (5 columns).

```
3624 MainStreet
                6207-ab cd
                                                Alarms:1 25-Apr-91 11:42A
     DATA CCT: M01-01 NAME:
   B7 B6 B5 B4 B3 B2 B1 B0
                                Configured As : SYNC - DCE - FULL DUPLEX Rate Adaption : HCM - 40 Kbps
FO F S D D D
    D D D D
F1
                               Transport Posn : B7
F2 D D D D -
                                Interface Speed : 9600 bps
                               Data Position : F0-B5
F3
                              Signalling : ON
Multi-Drop : DISABLED
Clock : SLAVE - LOCKED
F4
F5
F6
F7
F8
F9
  D - DATA F - FRAMING BIT S - SIGNALING BIT
CONFIG CIRCUIT 1-1 FUNCTION RATE_ADAPT
1-METHOD
                 2-TRANSP_BW
                                 3-TRANSP_POS
                                                 4-SIG_OFF
                                                                 5-I/F_SPEED
6-DATA_POSN
                                 8-CANCEL
                                                 9-QUIT
```

Figure G2-2: Transport Bandwidth

The maximum bandwidth available to the data device is 63.2 kb/s (64 kb/s less 800 b/s for the framing bit). If signalling is on for the circuit, the signalling bit stream takes up an additional 800 b/s, leaving 62.4 kb/s of bandwidth available.

# Pointers for setting transport bandwidth

If a HCM circuit is connected to a T1 channel that has jam bit 7 or robbed bit signalling enabled, the resulting loss of usable transport bandwidth must be considered. The setting of jam bit 7 is described in the Chapter D1, T1 Module Operating Parameters, in this manual.

Note how the column numbering for an HCM frame corresponds to the bit numbering of a T1 channel (see Figure G2-3).

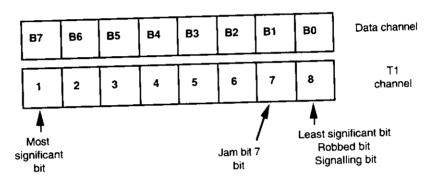


Figure G2-3: Bit Numbering Conventions

In the following examples it is assumed that the transport position is always B7 (described in the section G2-4, "Transport Position", in this chapter).

These examples do not cover all possibilities. Rather, they illustrate the need to consider the effects of robbed bit signalling, jam bit 7 and binary 8 zero suppression on the usable bandwidth.

- If the transport bandwidth is 64 kb/s (8 elements), and the customer's data protocol ensures an adequate ones' density, jam bit 7 does not alter bit 7 (B1) if enabled.
- ☐ If the transport bandwidth of the channel is 56 kb/s (7 elements), the 3624 automatically sets bit 8 (B0) to 1, ensuring an adequate ones' density. Therefore, jam bit 7 does not alter bit 7 (B1) if enabled.
- The RTS control lead signal is transported over bit 8 (B0). If RTS goes "low", bit 8 (B0) is changed to 0. Therefore, to ensure ones density, you must configure RTS to be "high", that is, "ON" (see the chapter on the specific data module in Volume F of this manual).

- If the customer's data protocol does not ensure an adequate ones' density and for some reason bit 8 (B0) is being altered (for example, by robbed bit signalling or RTS signalling), jam bit 7 may alter bit 7 (B1) and thus B1 is not available for data. The transport bandwidth must be 48 kb/s (6 elements) or less to prevent data errors.
- If a HCM circuit with a transport bandwidth of 64 kb/s (8 elements) is being connected to a T1 channel with robbed bit signalling enabled, the robbed bit signalling must be turned off or the bit 8 (B0) position not used (reduce the transport bandwidth to 56 kb/s (7 elements) or less). Selecting binary 8 zero suppression ensures an adequate ones' density in the data stream and disabling robbed bit signalling allows the use of 64 kb/s of bandwidth.

# To set the transport bandwidth

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION RATE\_ADAPT TRANSP\_BW

where pp is the module position number from 1 to 12 and c is 1 or 2, or A or B depending on the module that is being configured

The system prompts you for the bandwidth.

2. Enter the bandwidth:

<*n*> <Return>

where n equals the number of 8 kb/s columns (one of numbers between 1 through 8).

## **G2.4** Transport Position

In HCM rate adaption, transport position defines the column in which the F bit is located. The F bit is always in the first row (F0). The transport position is set by entering the column position in the form Bn, where n is the column number (0 through 7).

Default: B7

You do not need to change the transport position unless the circuit is being subrate multiplexed with transparent data. Then you must move the F bit so the columns that the transparent channel occupies, are not included in the HCM circuit's transport bandwidth.

The F bit must be in the same column as the framing bit for sub-rate multiplexing the circuits.

# To set the transport position

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION RATE\_ADAPT TRANSP\_POS

where pp is the module position number from 1 to 12 and c is 1 or 2, or A or B depending on the module that is being configured

The system prompts you for the column number.

#### 2. Enter:

<Bn> <Return>

where Bn equals one of B7 through B0

## G2.5 Interface Speed

The interface speed (data rate) is the rate at which the device is transmitting data. The number of Ds indicates the interface speed. Each D represents 800 b/s. For interface speeds of 2400 b/s or less, 2400 b/s of bandwidth is allocated (represented by 3 Ds on the NMTI screen).

The interface speeds supported by each module type and device mode are listed in Table G2-1.

Asynchronous rates of up to 2400 b/s that aren't listed in the table can be supported by over-sampling. To over-sample, set the interface mode to synchronous. Then multiply the asynchronous interface speed you wish to support by 16. Enter the next highest synchronous interface speed listed above.

For example, to support 110 b/s (asynchronous), set the interface mode to synchronous. Set the interface speed to 2400 b/s ( $16 \times 110 \text{ b/s} = 1760 \text{ b/s}$ , and 2400 b/s is the next highest synchronous interface speed supported).

G. Rate Adaption

Table G2-1: Interface Speeds for HCM

Module	Device Mode	Interface Speed (b/s)	Default (b/s)
DNIC	Asynchronous	150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400	9600
	Synchronous	150, 300, 600, 1200, 2400, 4800, 8000,9600, 16000, 19200, 32000, 38400,48000, 56000	9600
RS-232	Asynchronous	150, 300, 600, 1200, 2400, 4800, 9600, 19200	9600
DOM	Synchronous	150, 300, 600, 1200, 2400, 4800, 8000,9600, 16000, 19200, 32000, 38400,48000, 56000	9600
V.35 DOM	Asynchronous	150, 300, 600, 1200, 1800, 2400, 4800, 7200, 9600, 14400, 19200, 38400	9600
	Synchronous	150, 300, 600, 800, 1200, 1600, 2400, 4000, 4800, 7200, 8000, 9600, 12000, 14400, 16000, 16800, 19200, 24000, 28800, 32000, 38400, 40000, 48000, 56000, 57600	9600
X.21 DOM	Asynchronous	150, 300, 600, 1200, 1800, 2400, 4800, 7200, 9600, 14400, 19200, 38400	9600
	Synchronous	150, 300, 600, 800, 1200, 1600, 2400, 4000, 4800, 7200, 8000, 9600, 12000, 14400, 16000, 16800, 19200, 24000, 28800, 32000, 38400, 40000, 48000, 56000, 57600	9600
oαυ	n/a	2400, 4800, 9600, 56000	9600

# To set the interface speed

#### 1. Enter:

CONFIG CIRCUIT  $< pp-c > < Return > FUNCTION RATE_ADAPT I/F_SPEED$ 

where pp is the module position number from 1 to 12 and c is 1 or 2, or A or B depending on the module being configured

The system prompts you for the interface speed

**2.** Enter the interface speed in bits per second:

<speed> <Return>

## G2.6 Signalling

The signalling parameter determines whether the HCM frame includes a signalling bit stream (the S in Figures G2-2). Turning signalling off means that no bandwidth is taken up by signalling and that signalling is not transmitted through the network. The signalling can be set to:

☐ signalling on (SIG\_ON)

signalling off (SIG\_OFF)

Default: signalling on (SIG\_ON)

# To set the signalling

1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION RATE\_ADAPT

where pp is the module position number from 1 to 12 and c is 1 or 2, or A or B depending on the interface module being configured

2. Select:

SIG\_ON or SIG\_OFF

The softkey that does not appear is already selected.



NOTE: The NMTI automatically fills in the signalling bit to the left of the data position if signalling is on.

## **G2.7** The Data Position

The data position specifies the location of the first D. The data position is set by entering the row/column position in the form Ff-Bn, where f is the row number (0 through 9) and n is the column number (0 through 7). The D bit cannot occupy the same element as the F bit.

Default: F0-B5

You need to change the data position in two circumstances:

- if you are going to change the transport position or transport bandwidth so the data position is no longer within the HCM frame
- if you are going to sub-rate multiplex the HCM rate adapted circuit with another HCM rate-adapted circuit, you must change the data position so the D bits do not occupy the same elements

G. Rate Adaption



NOTE: The NMTI automatically fills in the signalling bit to the left of the data position if signalling is on.

# To set the data position

#### 1. Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION RATE\_ADAPT DATA\_POSN

where pp is the module position number from 1 to 12 and c is 1 or 2, or A or B depending on the interface module that is being configured

The system prompts you for the data position.

#### 2. Enter:

<Ff-Bn> <Return>

where Ff equals F0 through F9 and Bn equals B7 through B0

## G2.8 Transport Bandwidth, Transport Position and Data Position

The framing bit "F" defines the leftmost bit position of the transport bandwidth.

The first "D" bit must be in one of the columns defined by the "F" bit and the transport bandwidth.

For example, if the framing bit is in position F0-B7 and the transport bandwidth is going to be changed to 5 columns, the first D must be in column B7, B6, B5, B4 or B3 and cannot be in B2, B1 or B0.

## G3. DDS Rate Adaption

This chapter describes	Dataphone	Digital	Service	(DDS)	rate	adaption
------------------------	-----------	---------	---------	-------	------	----------

- configuring a circuit for DDS rate adaption
- configuring the interface speed

### G3.1 What is Rate Adaption

The specifications for T1 define a framing structure that allocates the available bandwidth in 64 kb/s channels. This structure arose from the sampling rate of 8,000 8-bit samples per second required for digitizing one voice call.

Data devices often operate at rates well below 64 kb/s, but the framing structure for a T1 link does not specifically support these rates. Rate adaption allows sub-rate data devices to use a 64 kb/s channel. Rate adaption multiplexes data from devices transmitting at less than 64 kb/s onto a T1 channel.

The 3624 can perform three types of rate adaption:

- ☐ transparent (TRANSPAREN)
- ☐ Newbridge's proprietary High Capacity Multiplexing (HCM)
- AT&T's Dataphone Digital Service (DDS)

Default: High Capacity Multiplexing (HCM)

Circuits that are a mixture of transparent and HCM rate adaption can be combined on one 64 kb/s channel. But a mixture is not possible with DDS rate adaption circuits.

DDS is only available if there is a DDS module on the Control card and if the DSP position is configured as DDS (see Chapter C1, Module Position Configuration, in this manual to configure the DDS module). If the device mode for the data device is synchronous, any method of rate adaption can be used. If the device mode is asynchronous, only HCM or DDS can be used. (For information on configuring data circuit operating parameters see the specific chapter on the data module in Volume F of this manual.)

Before you perform the configuration procedures described in this chapter, we recommend you fill out the node configuration forms found in the Node Configuration Forms manual. This makes configuration easier and provides a permanent record of your configuration settings.

G. Rate Adaption

#### G3.2 Overview of DDS Rate Adaption

DDS rate adaption converts HCM format into a "6+2 envelope" data format for connection to public synchronous network services such as AT&T's Dataphone Digital Service. Select DDS if you are connecting data equipment to public data network facilities using DDS DS-0A format.

DS-0A channels carry data from a single circuit using DDS rate adaption on a T1 link. DDS rate adaption is available for 2.4, 4.8, 9.6 and 56 kb/s bandwidths.



NOTE: The DSP module position must be configured as DDS before DDS rate adaption can be used.

## Format for a 56 kb/s channel

A 56 kb/s DDS channel consists of 7 data bits in bit positions 1 to 7 and a network control bit (C) in bit position 8 (see Figure G3-1).

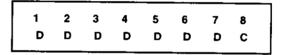


Figure G3-1: Format for a 56 kb/s DDS Channel

The control bit is a logical "1" if data bits 2 through 7 contain customer data. This ensures the ones' density requirement for the T1 link is met, since there can never be more than seven consecutive 0s.

The control bit is a logical "0" if data bits 2 through 7 contain a network control code. The ones density requirement is met, since an all zero network control code is invalid.

#### Format for subrate channels

For speeds below 56000 b/s (9600, 4800 and 2400 b/s), a DDS channel consists of a logical "1" in bit position 1 (older AT&T equipment may insert a "0"), 6 data bits in positions 2 through 7 and a network control bit (C) in bit position 8.

The control bit is a logical "1" if the data bits contain customer data. This ensures the ones' density requirement for the T1 link is met, since there can never be more than seven consecutive 0s.

The control bit is a logical "0" if the data bits contain a network control code. The ones' density requirement is met, since an all zero network control code is invalid.

In a 64 kb/s T1 channel, 8-bit bytes are transmitted at a rate of 8000 b/s. DDS sub-rate speeds are adapted to the 64 kb/s channel by sending "new" data every:

- ☐ 5th byte for 9.6 kb/s channels,
- ☐ 10th byte for 4.8 kb/s channels, or
- $\Box$  20th byte for 2.4 kb/s channels.

Each byte contains 6 data bits. These are illustrated in Figure G3-2. Bytes that don't carry new data carry "stuff bytes", which are repetitions of the latest data byte.

# To configure a circuit for DDS rate adaption

#### Enter:

CONFIG CIRCUIT <pp-c> <Return> FUNCTION

where pp is the module position number from 1 to 12 and c is either 1 or 2, or A or B depending on the module type

#### 2. Enter:

RATE\_ADAPT METHOD DDS

The DDS softkey is part of a softkey group; if it does not appear then DDS rate adaption is already selected.



NOTE: The FUNCTION softkey might not appear if the specified circuit is connected. In some cases, you must disconnect the circuit before changing its function.

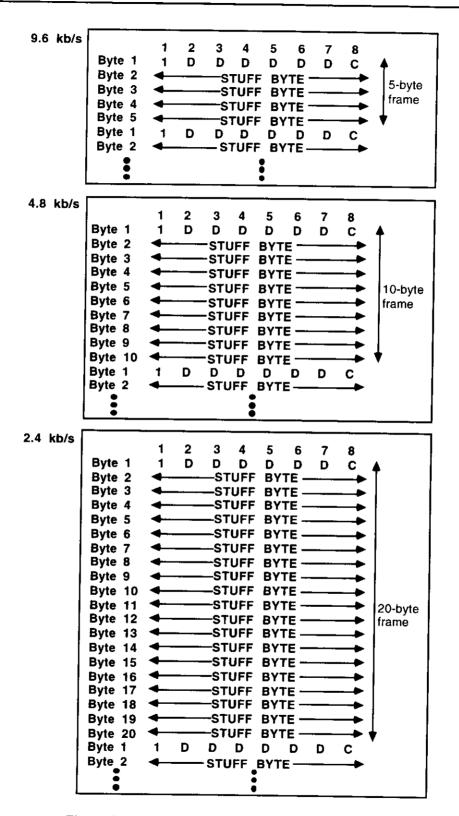


Figure G3-2: Rate Adaption Format for Sub-rate DDS Channels

#### G3.3 Interface Speed

The interface speed (data rate) is the rate at which the device is transmitting data. The speeds supported are:

- □ 2400 b/s
- ☐ 4800 b/s
- □ 9600 b/s
- ⊒ 56000 b/s

Default: 9600 b/s

All the above interface speeds are supported for synchronous data. For asynchronous data, 9600~b/s is not supported.

## To set the interface speed

1. Enter:

CONFIG CIRCUIT  $< pp-c > < Return > FUNCTION RATE_ADAPT I/F_SPEED$ 

where pp is the module position number from 1 to 12 and c is either 1 or 2, or A or B depending on the module type

2. Enter the interface speed, in bits per second:

<speed> <Return>

G. Rate Adaption

H. Timing

## **System Timing**

This chapter describes the configuration of the system timing, including:

- the timing source
- the source failure threshold
- the source recovery mechanism

## H1.1 Viewing System Timing

Two sources of synchronization available to the 3624 MainStreet are:

- the T1 trunk (frequency 1.544 Mb/s) and
- the internal system clock (frequency 8 kHz). When the synchronization is to this source, the timing is said to be free running.

One timing source provides network timing at any instant in time.

#### To view system timing

Enter:

#### CONFIG SYNCH

The data area of the NMTI displays the current configuration settings and status of the T1 synchronization source as shown in Figure H1-1. If the source has not yet been configured, the default settings are shown.

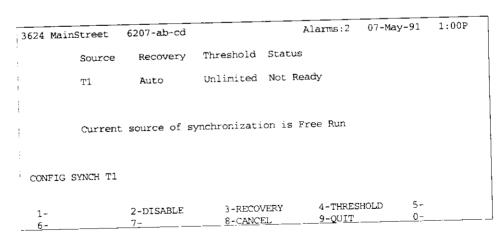


Figure H1-1: Synchronization Display

H1-1 H. Timing

Table H1-1 describes the entries that can appear under the "Status" heading.

Table H1-1: Status Headings

Heading	Explanation
Disabled	The source in manual recovery has failed. The system has unsuccessfully attempted timed recovery to the source. The source has exceeded the permissible failure rate (set under THRESHOLD). The source was disabled (by selecting DISABLE). The source is in the default state. The source was in the "Cannot Lock" state and an unsuccessful attempt to recover to the source was made.
Not Ready	The source is not available for system timing.
Ready	The source is available for system timing.
Current	The source is providing system timing.
Auto Rec	The source has failed and will be used by the system as soon as it becomes available.
Time Rec	he source has failed and the system is checking at timed intervals to see if it is available to provide system timing.
Cannot Lock	The system is unable to take timing from the source. It attempts to retake timing from the source shortly after this state is entered.

## To select the T1 source

#### 1. Enter:

#### **CONFIG SYNCH**

The configuration setting and status of the T1 synchronization source are displayed as shown in Figure H1-1.

#### 2. Enter:

#### **ENABLE or SELECT**

The T1 source is now the timing source (in the "Current" state).

The DISABLE softkey does not appear when the T1 is the current timing source or the T1 source is in the "Ready" state.

# To select the internal timing source

1. Enter:

CONFIG SYNCH

2. Enter:

DESELECT

The internal system clock is the timing source (in the "Current" state). The T1 source is moved to the "Ready" state.

To make the T1 trunk unavailable as a source of timing, select:

DISABLE

## H1.2 Setting the Failure Threshold

To take into account the possibility of an unreliable timing source, you can select a threshold for the number of times a source is allowed to fail in one hour. If the number of source failures exceeds this threshold, the source is disabled and the 3624 does not attempt to use the source again. The source must be enabled via the NMTI (or from a 4600-series network manager) before the source is again available as a source of timing.

The threshold can be set from 0 to 30 failures per hour or there can be no threshold (UNLIMITED).

Default: UNLIMITED

## To assign the failure threshold

L. Enter:

CONFIG SYNCH THRESHOLD

2a. To enter a threshold, enter:

<number> <Return>

where the number of failures permissible per hour is in the range 0 through 30. We recommend you enter a number higher than 1.

2b. If you want no threshold, select:

UNLIMITED

#### H1.3 Failure Recovery

When a failed T1 source becomes available again (enters the "Ready" state), the *3624* attempts to recover to it. You can specify the criteria under which the *3624* attempts to mark a source as "Ready":

- ☐ automatically (AUTO)
- ☐ timed (30\_SEC, 1\_MIN, 10\_MIN, 30\_MIN)
- ☐ manually (MANUAL)

Default: automatically (AUTO)

**Automatic recovery:** a failed source becomes available to the system (enters the "Ready" state) as soon as it recovers.

Timed recovery: the system checks up to four times after the specified time interval to see if the source has recovered. If the source has recovered when the system checks, it becomes available to the system (enters the "Ready" state) and is the current source if it is enabled. If the source does not recover by the end of the fourth check, the system places the source in the "Disabled" state. Recovery to the source can then only occur through selection of the ENABLE softkey (see section H1.1, "Viewing System Timing", in this chapter).

**Manual recovery:** the system places the failed source in the "Disabled" state. The source is not used as a source of synchronization until it is manually selected.

## To configure the 1. recovery method

Enter:

CONFIG SYNCH RECOVERY

2. Select the conditions under which the system attempts recovery of a failed timing source:

AUTO or 30\_SEC or 1 \_MIN or 10\_MIN or 30\_MIN or MANUAL

I. Network Management

## I1. Configuration for Network Management

This chapter describes how to configure a 3624 MainStreet for communication with a 4600-series MainStreet network manager system. It describes:

- assigning a node number and a network operations phone number
- configuring the communication path
- logging alarms to the network manager

The procedures described in this chapter must be carried out at the 3624 MainStreet's node management terminal. Once these procedures are completed, the network manager can perform all remaining configuration and maintenance. For more information about network management, consult the network manager documentation.



NOTE: The 4602 MainStreet Intelligent NetworkStation only recognizes software generic 6207 of the 3624 MainStreet.

## I1.1 Assigning a Node Number

Using a 4600-series MainStreet network manager you can configure, continuously monitor and maintain the 3624 MainStreet from a central location.

The 3624 MainStreet must be assigned a node number before it can be recognized by a 4600-series network manager. The node number is the Control Packet Switching System (CPSS) address used by other Newbridge products to identify and communicate with a node. Each node must have a unique node number. In the 4600-series documentation, the node number is referred to as the "CPSS node ID".

CPSS is Newbridge's proprietary communication protocol, a packet-switched system similar to X.25. *MainStreet* products use CPSS to exchange information with each other.

For the node number to take effect, you may have to restart the system. The NMTI displays a message if this is the case. Before you restart the system, back up the configuration information as described in Chapter 6, Viewing CPSS Routing Information, in the Maintenance manual.

I. Network Management

To restart the system, log off the NMTI, turn off the 3624 MainStreet's power switch (AC system) or circuit breaker (DC system), turn the power switch or circuit breaker on again and log onto the NMTI. The restart does not affect configuration or maintenance records, but all active calls are dropped.

Default: no node number assigned

## To assign a node 1. number

#### 1. Enter:

HOUSE MORE NODE\_NUM

The 3624 prompts you to enter the node number.

#### 2. Enter:

<number> <Return>

where number is any number between 1 and 999, inclusive

#### I1.2 Setting the Network Operations Center Number

The Network Operations Center (NOC) is the location of the computer running network manager software. The NOC number is the phone number of the modem serving the computer running 4600-series network manager software. The 3624 can establish communications with the NOC via the Public Switched Telephone Network (PSTN) should the primary rate link fail.

When entering the phone number, include any prefix digits or area code information as if the number were dialed manually from a phone. The number can include the Hayes AT® modem dial modifiers ("," = pause, "W" = wait for dial tone, "@" = wait for silence, etc.). For example, to dial a long distance number from a PBX that provides a second dial tone after the digit 9, enter "9W1-613-591-3600".

By default, the 3624 MainStreet instructs the modem to dial the NOC number using dial pulsing. For the modem to dial using Dual-Tone Multi-Frequency (DTMF), the NOC number must be preceded by the characters "DT".

Default: no NOC number assigned

## To enter the NOC number

1. Enter:

HOUSE MORE NOC\_NUM

The NMTI prompts you to enter the NOC phone number.

2. Enter:

<phone number> <Return>

## I1.3 Configuring the Communication Path

Control Packet Switching System (CPSS), Newbridge's proprietary communication protocol, allows network nodes to use CPSS messages to exchange information with each other.

CPSS messages carry:

- status information, enabling nodes to construct routing tables;
- control information, allowing 4600-series MainStreet family network managers to send commands to notes; and
- alarm information, allowing the 4600-series to gather diagnostic information.

A communication path between the 3624 and a 4600-series network manager can be established in one of three ways:

- remotely, through modems and the Public Switched Telephone Network (PSTN) ("A" in Figure I1-1);
- locally, through one of the 3624 's serial ports ("B" in Figure I1-1); or
- remotely, over the T1 link ("C" in Figure I1-1).

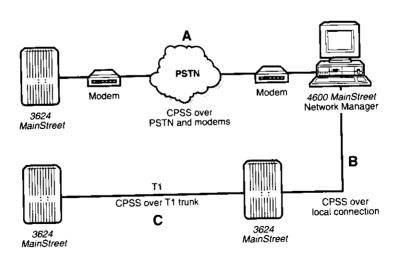


Figure I1-1: Network Management Communication Paths

# To connect locally via a serial port

The computer running the network manager software is connected either to J6 (serial port 1) or J5 (serial port 2) connector.

1. Select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2

2. Select:

**BAUD RATE** 

3. Set the baud rate of the serial port to match the baud rate of the computer running the network manager software, select:

300 or 600 or 1200 or 2400 or 4800 or 9600

4. Select:

PORT\_TYPE CPSS

# To connect via modem and the PSTN

The modem is connected either to the J6 (serial port 1) or the J5 (serial port 2) connector on the Control card.

1. Select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2

2. Select:

BAUD\_RATE

Set the baud rate of serial port to match the baud rate of the modem, select:

300 or 600 or 1200 or 2400 or 4800 or 9600

4. Select:

PORT\_TYPE CPSS\_MODEM

5. Enter:

MORE NOC\_NUM <phone number> <Return>

## T1 trunk connection

The connection to the primary rate link (T1) can be made in one of two ways:

- via the Facility Data Link (FDL)
- ☐ via a T1 circuit

For the 3624 MainStreet to communicate with a 4600-series network manager over the T1 trunk, there must be a DTU module installed in either the DTU or FDL socket on the Control card. The NMTI displays a warning message if the necessary module is missing when you configure the FDL connection.

# To send CPSS messages on the Facility Data Link

1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS

2. Select:

**ESF** 

If ESF is not displayed, it is already selected.

3. Select:

FDL\_CPSS

The FDL\_CPSS/FDL\_UNUSED softkey is a toggle softkey; the softkey that does not appear is already selected.

#### To disconnect the FDL for CPSS

1. Enter:

CONFIG POSITION <T1> <Return> OPTIONS

2. Select:

FDL\_UNUSED

The FDL\_CPSS/FDL\_UNUSED softkey is a toggle softkey; the softkey that does not appear is already selected.

# To send CPSS messages on a T1 circuit

1. Enter:

CONFIG CONNECT <T1-cc> <Return>

2. Select:

TO\_CIRCUIT

3. Enter:

<CPSS> <Return>

## To disconnect CPSS

1. Enter:

CONFIG CONNECT <T1-cc> <Return>

2. Enter:

DISCONNECT

#### I1.4 Logging Alarms

The three options for logging alarms are:

- □ logging alarms to the Network Operations Center (NOC) via the T1 link (RMT\_ON/RMT\_OFF)
- logging alarms to the NOC via a modem (MDM\_ON/MDM\_OFF)
- logging alarms to a device (such as a printer) connected to the serial port not being used by the node management terminal (LCL\_ON/LCL\_OFF)

All three options can be active simultaneously.

Remote logging of alarms in normally done via the CPSS messages.

The MDM\_ON option is available only if one of the two serial ports has been configured as CPSS\_MODEM (see Chapter B1, Serial Ports, in this manual).

The LCL\_ON option is available only if one of the two serial ports has been configured as PRINTER (see Chapter B1, Serial Ports, in this manual).

Default:

remove logging alarms to the NOC (RMT\_OFF) remove logging alarms via a modem (MDM\_OFF) remove logging alarms to a printer (LCL\_OFF)

To log alarms to the 4600-series network managers

1. Enter:

ALARMS MORE LOGGING

2. Select:

RMT\_ON or RMT\_OFF MDM\_ON or MDM\_OFF LCL\_ON or LCL\_OFF

The softkey that does not appear is already selected.



Newbridge has attempted to accurately describe the intended functionality and operational procedures of this product. However, Newbridge does not warrant that the product will meet your particular requirements or that the product will not be subject to modifications.

Selected functionality may not be available in this release. Please contact your Newbridge regional sales office for specific release dates.

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# 3624 MainStreet Intelligent T1 Channel Bank

Release 7 Generic 6107/6207

Maintenance





## **Foreword**

The documentation set of the 3624 MainStreet Intelligent T1 Channel Bank contains the following manuals:

☐ Installation (Part number 95-B200-01-00-B)
 ☐ Configuration (Part number 95-B400-01-00-B)
 ☐ Maintenance (Part number 95-B500-01-00-B)
 ☐ Quick Reference Guide (Part number 95-B450-01-00-B)
 ☐ Node Configuration Forms (Part number 95-B460-01-00-B)
 ☐ Ordering Information (Part number 95-B050-01-00-B)
 ☐ Index (Part number 95-B005-01-00-B)
 ☐ Content Summary (Part number 95-B000-01-00-B)

**Installation:** This manual provides the instructions required to install and set up the 3624.

**Configuration:** This manual provides the instructions required for all configuration operations for the *3624*.

**Quick Reference Guide:** This manual contains a summary of the configuration and maintenance commands.

**Node Configuration Forms:** This manual contains a series of forms to fill out for planning and recording the configuration settings.

**Ordering Information:** This manual lists the available 3624 parts and their ordering numbers.

**Index:** This manual contains the indexes for the Installation, Configuration and Maintenance manuals.

**Content Summary:** This manual provides a listing of the main content of the manuals in the documentation set.

#### Maintenance

This manual explains all maintenance activities and how to perform them.

Not all 3624 MainStreet systems include all of the components or features described in this manual. The components included and the features supported depend on the type of system and the generic software. This documentation set describes the software generics 6107 and 6207, Release 7.

This documentation set describes the management of the 3624 node using the NMTI. A node management session can be initiated from the 4600 MainStreet family of network managers. If you are using a network manager, the menus and screens displayed by the network management software are the similar to those described in this documentation. Refer to the 4600 documentation for more detailed information.

#### **Symbols**

Several symbols, explained below, are used in the 3624 documentation to draw your attention to important information.



DANGER: Danger indicates that the described activity or situation may pose a threat to personal safety.



WARNING: A warning indicates that the described activity or situation may/will cause equipment damage.



CAUTION: A caution indicates that the described activity or situation may/will cause service interruption.



NOTE: Notes provide information that is or may be of special interest.

## **Table of Contents**

Fore	word		:::
	Mainter	nance	111
	Symbols		I V
Tabl	e of Cont	tents	
1.	Visual	Indicators	4 4
	1.1	3624 MainStreet LEDs	1-1
	1.2	Control Card LEDs	1-4
	1.3	Interface Card LED	1-0
	1.4	Module LEDs	1-0
2.	Alarm	s	
	2.1	Alarm Conditions	2-1
	2.2	Alarm Classification	2-3
	2.3	Viouring and Editing Alarm Oueues	2-3
	2.4	Logging Alarms	,
	2.5	External Alarm Indication	2-8
3.	Syste	m Diagnostics	3.1
	3.1	Diagnostic Tests	
	3.2	Running Specific Diagnostic Tests	2-A
	3.3	Viewing Diagnostics	
	3.4	Viewing and Editing Signalling Leads	
	3.5	Programme Circuite	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	3.6	Displaying Information on Interface Modules and the Control Card	
4.	Loopl	packs	
	4.1	Using Loophacks	4-1
	4.2	Voice Interface Module Loopbacks (E&M, LGS, LGE, and MKD)	<i>.</i> <del>4</del> - 4
	4.3	Loophacks for 2601, 2602 and 2603 DTUs	4-4
	4.4	Loophacks for the 2606 DTU	4-(
	4.5	Loophacks for the 2608 and 2610 DTUs	4-0
	4.6	OCI Module Loopbacks	4-10
	4.7	DCM Loopbacks	<del>4</del> -1.
	4.8	T1 Circuit Loopbacks	<del>4</del> -1,
	4.9	T1 Link Loophacks	4-14
	4.10	DDS Loopbacks	<del>4</del> -13
	4 11	Network Loopbacks	4-1

5.	<b>Dat</b> 5.1	abase Management Preserving Your Configuration Database
	5.2	Viewing NVM Information 5-2
	5.3	Backing Up the Configuration Database
	5.4	Verifying the Backup File5-5
	5.5	Restoring Configuration Settings
		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
6.	Vie	wing CPSS Routing Information
	6.1	The Routing Table6-1
	6.2	Viewing Network Nodes 6-2
7.	Uan	dryana Maintanana
7.		dware Maintenance
	7.1	Testing the Voltages of the Power Rails
	7.2 7.3	Testing and Replacing the Fuse (AC Power Supply), Wall-mount Unit7-2 Testing and Replacing the Fuse (AC Power Supply), Rack-mount Unit7-5
List	of F	igures
Figur	e	Title
1-1		Location of LEDs on the Wall-mount Unit1-2
1-2		Location of LEDs on the Rack-mount Drawer
1-3		The Universal Interface Card LED
1-4		LEDs on LGS Module1-7
1-5		LEDs on the X.21 Module
2-1		Default Display of the Alarm Conditions2-4
2-2		Typical Alarm Queue Display2-5
3-1		Signalling Leads Display3-7
3-2		Displaying Information on Modules and the Control Card3-9
4-1		Loopback A, Voice Interface Modules
4-2		Loopback B, Voice Interface Modules4-2
4-3		Loopback C, Voice Interface Modules4-3
4-4		Loopback A, 2601, 2602 and 2603 DTUs
4-5		Loopback B, 2601, 2602 and 2603 DTUs
4-6		Loopback C, 2601, 2602 and 2603 DTUs
4-7 4-8		Loopback A, 2606 DTU
4-0 4-9		Loopback B, 2606 DTU
4-10		Loopback C, 2606 DTU
4-10		Loopback A on Port A, 2608 and 2610 DTUs
4-12		Loopback B and C on Port B, 2608 and 2610 DTUs
4-13		Loopback C on Port A, 2608 and 2610 DTUs
		<u> </u>

<u> </u>		
4-14	OCU Module Loopback	4-10
4-15	Loophack C. OCU Module	4-10
4-16	Loopback B. RS-232, X.21 and V.35 DCMs	4-11
4-17	Loopback C. RS-232, X.21 and V.35 DCMs	4-12
4-18	Loopback A, T1 Circuit	4-13
4-19	Loopback C, T1 Circuit	4-13
4-20	T1 Equipment Loopback	4-14
4-20	T1 Line Loopback	4-15
4-21	OCU Loopback, Network-directed	4-16
	CSU Loopback, Network-directed	4-16
4-23	C30 E00pback, Network affected minimum	
5-1	Screen Display of NVM Data	5-2
6-1	Sample Newbridge Network	6-2
6-2	SHOW_NODES Display	6-3
0 2	, , , , , , , , , , , , , , , , , , ,	
7-1	Power Rail Test Points	7-1
7-1 7-2	Location of the Fuse Holder, Wall-mount Unit	7-3
7-2 7-3	Removing the Fuse Holder	7-3
7-3 7-4	Fuse Holder	7-4
7-4 7-5	Location of the Fuse Holder, Rack-mount Drawer	7-5
	Removing the Fuse Holder	7-6
7-6 7-7	Fuse Holder	7-6
List of	Tables	
Table	Title	
1-1	Operation of the Chassis Cover (Faceplate) LEDs	1-2
1-2	Possible Solutions to Control Cover (Faceplate) LED Problems	1-3
1-3	Circuit Status Indicators	1-8
2-1	Alarm Conditions	2-2
2-2	Column Heading Explanation for Alarm Queue Display	2-6
3-1	Diagnostic Tests	3-1
3-2	Incoming and Outgoing Signalling Leads	3-6
~ <del>-</del>		
6-1	Display Headings	6-3
7-1	Power Rail Voltages and Tolerances	7-2
, - <u>T</u>		

## 1. Visual Indicators

This chapter describes the visual indicators, including:

- ☐ Light-emitting Diodes (LEDs) on the system cover
- ☐ LEDs on each type of module
- maintenance procedures required when LEDs indicate a problem
- configuration of the seven-segment display on the Control card

#### 1.1 3624 MainStreet LEDs

LEDs are located on the chassis cover (of the wall-mount unit) and the faceplate (of the rack-mount drawer), on the Control card, the Interface card(s) and the Interface card modules.

Figure 1-1 shows the location of the LEDs on the chassis cover and the Control card of the wall-mount unit.

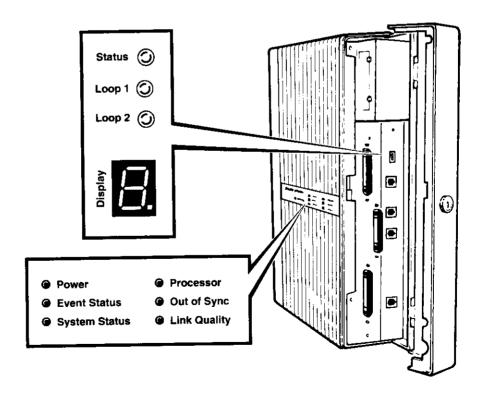


Figure 1-1: Location of the LEDs on the Wall-mount Unit

Figure 1-2 shows the LEDs on the faceplate of the rack-mount drawer and the Control card (viewed from the rear of the shelf unit).

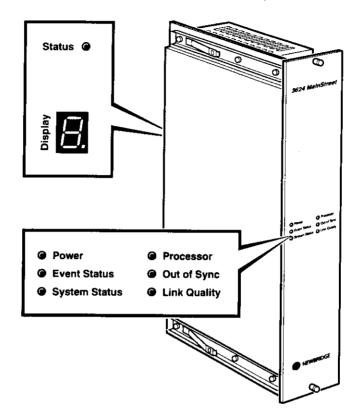


Figure 1-2: Location of the LEDs on the Rack-mount Drawer

## Chassis cover (faceplate) LEDs

The six LEDs, found on the chassis cover of the wall-mount unit and the front faceplate of the rack-mount drawer, are listed in Table 1-1. The operation and colour of each LED is indicated also. If the system is operating normally:

- ☐ the Power LED lights continuously;
- the Processor LED flashes continuously in one second intervals; and
- the Event Status, System Status, Out of Sync and Link Quality are unlit.

Table 1-1: Operation of the Chassis Cover (Faceplate) LEDs

LED	Colour	Lit	Flashing	Off
Power	green	Power is supplied to the system	N/A	No power to system*
Event Status	yellow	An unacknowledged alarm is in the Major Alarm queue*	N/A	Normal operation All alarms are acknowledged
System Status	red	Indicates system problems*	N/A	Normal operation
Processor	green	System problem*	Normal operation	N/A
Out of Sync	red	Communication with T1 link is lost*	N/A	Normal operation
Link Quality	red	T1 line is in an error state*	N/A	Normal operation

\*See Table 1-2

See Table 1-2 for possible solutions if the system LEDs are not operating normally.

Table 1-2: Possible Solutions to Chassis Cover (Faceplate) LED Problems

Problem	Action or Indication
Power LED is off	<ol> <li>Check that the power switch or circuit breaker is on.</li> <li>Check that the power cable is correctly attached to the system and to a power source.</li> <li>Check that the wiring harness connector from the power supply to the Control card is correctly seated.</li> <li>Check that the ribbon cable running from the Control card to the chassis cover (or faceplate) is correctly attached at both ends.</li> <li>Check the fuse to see if it is burnt out (see Chapter 7, Hardware Maintenance, in this manual).</li> <li>Check the power rails are at the correct voltage (see Chapter 7, Hardware Maintenance, in this manual).</li> </ol>
Event Status LED is lit	Check the Major Alarm queue.
System Status LED is lit	Indicates:  a problem with the LIM module, DSX-1 module, CSU module, DSP module, T1 interface, Tone module, or connected DTUs; a module position configured as 'empty' contains a module; a circuit is out of sync with its associated DTU; or trunk conditioning is being applied due to a T1 link failure.
Processor LED stops flashing	<ol> <li>Check the seven-segment display on the Control card. If the seven-segment displays a number continuously, note the number and contact your service representative for help.</li> <li>If the seven-segment display flashes a number, it indicates one of three possibilities, depending upon its configuration:         <ul> <li>the number of alarms in the Major Alarm queue,</li> <li>the number of the last alarm, or</li> <li>the number of background test currently being run.</li> </ul> </li> <li>If the seven-segment display is unlit, turn the power switch off and then on. If the display still does not flash, contact your service representative.</li> </ol>
Out of Sync LED is unlit	<ol> <li>Check the T1 line.</li> <li>Make sure the T1 line is connected to connector J4 on the Control card.</li> <li>Make sure that the LIM, DSX-1 or CSU module is properly seated.</li> <li>Make sure the other end is transmitting.</li> <li>Ensure the T1 operating parameters are compatible with the network.</li> </ol>
Link Quality LEC is lit	An error state is caused by one of the following conditions:  the T1 line has experienced a framing error rate greater than 1x10E <sup>-3</sup> for consecutive seconds. This puts the line in the Framing Error state, which is not cleared until the framing error rate is less than 1x10E <sup>-6</sup> for 10 consecutive seconds.  the T1 line is using Extended Superframe Format (ESF) and the Cyclic Redundancy Check (CRC) error rate is greater than 1x10E <sup>-3</sup> for 10 consecutive seconds, or the T1 line is using D4 framing and the Bipolar Violation (BPV) error rate is greater than 1x10E <sup>-3</sup> for 10 consecutive seconds Either of these conditions puts the line in the Failed State, which is not cleared until the error rate is less than 1x10E <sup>-6</sup> for 10 consecutive seconds.

#### 1.2 Control Card LEDs

	Figure 1-1 and Figure 1-2 show the location of Control card indicators. The Control card indicators normally operate as follows:
	the power indicator, the red dot on the seven-segment display, is continuously lit;
	the red seven-segment display continuously flashes a number; the two red loopback LEDs are lit when a loopback is present, (some
	versions of the Control card do not have loopback LEDs); and the red Control card Status LED is lit continuously.
Power indicator	In normal operation, the power indicator (the dot) on the seven-segment display lights to indicate power is being supplied to the system.
	If the power indicator does not light,
	<ul> <li>check that the power cord is firmly plugged in at both ends,</li> <li>ensure that the power switch or circuit breaker is on,</li> <li>ensure there is power at the outlet, and</li> </ul>
	check that the fuse is good, as described in Chapter 7, Hardware Maintenance, in this manual.
Seven-segment lisplay	In normal operation, the seven-segment display flashes a number that indicates the number of alarms in the Major alarm queue. For a one-digit number, the display shows the number for one-half second then goes blank fo one-half second. For a two-digit number, the display shows the first digit followed by the second digit one-quarter second later, then goes blank for one half second.
	If the seven-segment display is not flashing, turn the power switch off and then on. If the display still does not flash, contact your service representative.
	The seven-segment display on the Control card can be configured to indicate one of the following:
	the number of alarms in the Major Alarm queue (ALRM_COUNT) the number of the last alarm (LAST_ALARM) the number of the background test currently running (BKGND_TEST)
	Default: the number of alarms in the Major Alarm queue (ALRM_COUNT)
	For details on the Major Alarm queue and alarm code numbers, see Chapter 2, Alarms, in this manual. For details on background tests see Chapter 3, System Diagnostics, in this manual.

# To configure the 1. seven-segment display

1. Enter

MAINT DISPLAY

2. Select:

ALRM\_COUNT or LAST\_ALARM or BKGND\_TEST

Loopback LEDs

Loopback LEDs are provided on some versions of the Control card.

LED "Loop 1" is lit if there is a loopback on any Interface card circuit.

LED "Loop 2" is lit if there is a loopback on the T1 link or any of the 64 kb/s channels (T1 circuits).

Status LED

In normal operation, the Control card status LED is continuously lit. If the Status LED flashes or does not light, there is a problem with the Control card.

#### 1.3 Interface Card LED

The Interface card has a single red card Status LED as shown in Figure 1-3.

This LED operates the same for both the Universal and LGS Interface cards on the wall-mount and rack-mount units.

During normal operation, this LED is continuously lit.

If the Status LED flashes or does not light, the system does not recognize the card.

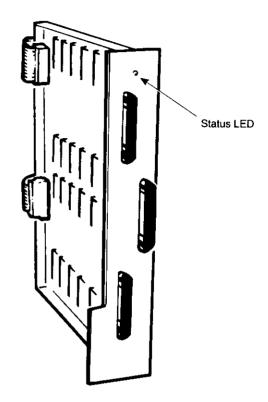


Figure 1-3: The Interface Card LED

#### 1.4 Module LEDs

The LGS, LGE, E&M, 4W TO, RS-232 DCM, OCU and MRD modules each have three LEDs, as shown in the example of the LGS module in Figure 1-4. The DNIC module, the X.21 DCM, and the V.35 DCM each have two LEDs, as shown in the example of the X.21 module in Figure 1-5. All of these modules can be installed on the Universal Interface card.

Only the LGS, LGE and the MRD modules can be installed on the LGS Interface card.

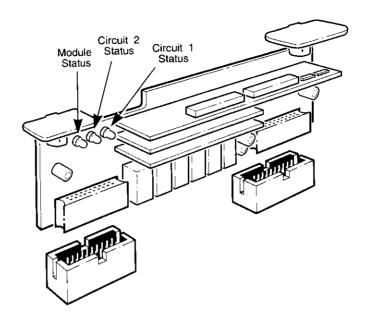


Figure 1-4: LEDs on LGS Module

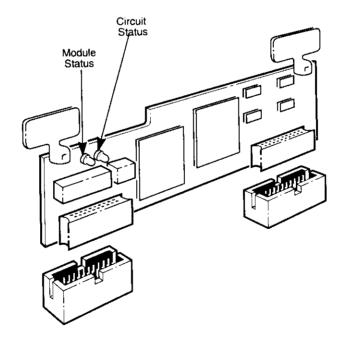


Figure 1-5: LEDs on the X.21 Module

## Module status LED

On all modules, the outermost LED is a module status LED. In normal operation, the module status LED is continuously lit. The module status LED is yellow or green in colour.

If the module status LED does not light, the installed module does not match the type configured for the module's position. Reconfigure the module position to match the type of module installed (see Chapter C1, Module Positions, in the Configuration manual).

If the module status LED flashes on and off, a fault condition has been detected on one or the other circuit.

## Circuit status or line status LED

On the LGS, LGE, E&M, 4W TO, RS-232 DCM, OCU and MRD modules, each circuit on the module has a status LED. The circuit status LED is red or green.

On the DNIC module the the circuit status LED is called the line status LED (red).

The X.21 and V.35 DCMs each have a single circuit status (green) LED.

Table 1-3 lists what a lit LED indicates for each module.

Table 1-3: Circuit Status Indicators

Module	A Lit Circuit Status LED Indicates:
LGS	A call is active on the circuit.
LGE	A call is active on the circuit.
E&M	A call is active on the circuit.
4W TO	A call is active on the circuit.
RS-232 DCM	When the circuit is configured for HCM or DDS rate adaption, the LED lights when the data is in synchronization. The LED is continuously lit if transparent rate adaption is selected.
œu	The circuit is processing a data signal.
MRD	A ring voltage is being detected by or is being generated by the circuit.
DNIC	The attached DTU is in synchronization with the DNIC modules.
X.21 DCM	When the LED is continuously lit, it indicates the circuit is configured to transparent rate adaption. When the circuit is configured for HCM, the LED lights whenever HCM synchronization is achieved.
V.35 DCM	When the LED is continuously lit, it indicates the circuit is configured to transparent rate adaption. When the circuit is configured for HCM, the LED lights whenever HCM synchronization is achieved.

## 2. Alarms

This chapter describes the alarms monitored by the 3624, including:

listing the alarm conditions the 3624 monitors
viewing and editing the alarm queues
classifying each alarm
selecting the alarm logging method
the configuration of the external alarm connector on the Control card

## 2.1 Alarm Conditions

The 3624 MainStreet continuously monitors the system for abnormal conditions or significant events. When an abnormal condition is detected, an alarm record is created and stored in one of three alarm queues:

the Major alarm queue
 the Minor alarm queue
 the Diagnostic alarm queue

Table 2-1 lists and describes the alarm conditions recorded by the 3624.

Many of the alarms in Table 2-1 have corresponding clearing alarms. For example "Red Alarm" has the corresponding "Red Alarm Cleared". Clearing alarms are listed in the same queue as their corresponding declaration alarm.

Table 2-1: Alarm Conditions

Alarm	Code#	Description
Busy Out Applied	79	A 4602 MainStreet Intelligent NetworkStation system has busied out the T1 link.
CSU Loopback Activated	82	A CSU loopback has been activated on the T1 link.
Database Reset	106	The nodes database has been reset.
Device Failed	49	The background or directed diagnostics detected a failed device. Locate and replace the device.
External Alarm Raised	20	If the alarm connector (J7) is enabled as an open circuit, this alarm means the circuit is open. If enabled as closed, the circuit is closed.
Failed State	72	The T1 link experienced ten consecutive severely errored seconds and has been taken out of service.
Framing Err Rate Exceeded	51	The error threshold for the T1 link has been exceeded.
Module Failure*	58	A module is either not responding to the system or it failed the common circuitry start up diagnostics.
Module Removed	60	A module was removed. No action is required.
Module Reset	108	A module has been reset.
NVM Error*	4	There is a problem with the non-volatile RAM on the Control card. Record the alarm's subcode and parameters, then run the DIRECTED test no. 3 (see Chapter 3, System Diagnostics in this manual). After the test, record information on the NVM given in the MAINT NVM_DATA menu.
Power Rail Failed	64	One of the power rails does not have power.
Red Alarm	8	Framing cannot be found on the T1 link.
Revision/Feature Mismatch	57	The Control card and software versions are mismatched, or a necessary Control card module is missing. The second parameter identifies what caused the alarm:  0 unknown cause  1 the card and software are incompatible  4 the FDL_CPSS softkey has been selected with an incompatible Control card  5 a DTU module is needed in the DTU socket  6 a DTU module is needed in the FDL socket.
Ring Generator Failed	<b>66</b>	The ringing generator failed.
Signalling Fault	107	This alarm indicates that a card or circuit has generated an abnormal amount of signalling activity to the Control card. If a card caused the excessive activity, it is held in reset for 30 minutes before being returned to service. If a circuits was responsible for the excessive signalling, it is disconnected an must be reconnected via the CONFIG CIRCUIT CONNECT menu.
Super-rate Conn Removed	123	A super-rate connection between a DCM and the T1 link was temporarily removed because of a "Reserved position violation".
Synch Source hanged	55	The synchronization source has been changed.
ynch Source Failure	36	The timing source has been lost. No action is required.
ynch Src Recovery ailed	56	The system attempted to recover a lost timing source but did not succeed. No action is required.

\*An abnormal operating condition which may or may not affect system operation. To verify whether system operation is affected, note the circumstances leading to this alarm and all alarm details and advise the nearest Newbridge field support office.

Table 2-1: Alarm Conditions (continued)

Alarm	Code#	Description
System Advisory (DA)*	17	This is a diagnostic software alarm related to Device Administration.
System Advisory (SA)*	2	This is a diagnostic software alarm related to System Administration.
Tail Circuit Gone	ଖ	The connection between an OCU module and a DTU has been lost. This alarm is not raised if the OCU module is removed. Locate the trouble and reconnect or replace the equipment as necessary.  OR  The connection between a DNIC module and a DTU is lost. This alarm is not raised if the DNIC module is removed. Locate the trouble and reconnect or replace the equipment as necessary.
Wrong Interface Card	48	A module position on the LGS Interface card is configured for a module other than LGS, LGE, or MRD. Reconfigure the position.
Wrong Module in Position	3	The module installed in a position does not match the type configured. The first parameter is the module position number. Either reconfigure the position or install the type of module configured.
Wrong/No Module Installed	37	The wrong module/no module has been installed.
Yellow Alarm	10	The far end cannot find the T1 framing.

<sup>\*</sup>An abnormal operating condition which may or may not affect system operation. To verify whether system operation is affected, note the circumstances leading to this alarm and all alarm details and advise the nearest Newbridge field support office.

### 2.2 Alarm Classification

Alarms a	are	classified	into	three	types:
----------	-----	------------	------	-------	--------

- major alarms (MAJOR)
- minor alarms (MINOR)
- diagnostic (DIAGNOSTIC)

In the default configuration, some alarm conditions are classified as Major alarms while others are classified as Diagnostic alarms. When an alarm condition is detected, the alarm is recorded in the queue for its classification. The corresponding clearing alarm is recorded in the same queue.

Alarm conditions can be reclassified to appear in a different alarm queue. Alarm classification suggestions are:

- Major alarms, for alarms that are service threatening;
- Minor alarms, that need attention but do not immediately threaten service; and
- ☐ Diagnostic alarms, which are advisory.



NOTE: An alarm cannot be reclassified if there are any entries in its alarm queue.

## To classify an alarm condition

#### 1. Enter:

#### **ALARMS CONFIG**

The alarm list is displayed as shown in Figure 2-1, showing the default configuration for the alarm conditions.

3624 MainStreet 6207-ab-cd	l	Ala	arms:2	04-JUL-91	2:20R
Code # Code	Priority	Code #	Code	P	riority
2 System Advisory (SA) 3 Wrong Module In Position 4 NVM Error 8 Red Alarm 10 Yellow Alarm 17 System Advisory (DA) 20 External Alarm Raised 36 Synch Source Failure 37 Wrong/No Module Installed 48 Wrong Interface Card 49 Device Failed 51 Framing Err Rate Exceeded 55 Synch Source Changed 56 Synch Src Recovery Failed	MAJOR MAJOR MAJOR MAJOR DIAGNOSTIC MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR	58 Module 60 Module 61 Tail ( 64 Power 66 Ring ( 72 Faile 79 Busy ( 82 CSU Lo 106 Datak 107 Signa 108 Modul	e Failure e Removed Circuit G Rail Fai Generator d State Out Appli oopback A base Rese alling Fa le Reset	one DI led Failed ed ctivated t	MAJOR AGNOSTIC AGNOSTIC MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR MAJOR
ALARMS CONFIG *?* Enter the alarm code number	•				
1- 2-	3 -		-	5-	
6- 7-	8-CANCEL	. 9	-QUIT	0~	

Figure 2-1: Default Display of the Alarm Conditions

The NMTI prompts you to enter the alarm code.

#### 2. Enter

<code #> <Return>

where code # is the number from the 'code #' column in Figure 2-1

### 3. Select:

MAJOR or MINOR or DIAGNOSTIC

The priority of the alarm changes to the entered classification.

## 2.3 Viewing and Editing Alarm Queues

When an alarm condition is detected, the alarm is recorded in the queue for its classification. Each queue can hold up to 64 alarms. If the number of alarms in the queue goes over 64, the alarm, "Too Many Alarms", occurs and no additional alarms are recorded in the queue until some or all of the alarms are deleted.

Alarms are displayed with the most recent alarm at the top of the list. The screen may not be able to display all the alarms at once if the list is too long. You can scroll through the list to:

- view earlier alarms (move "down a page") (EARLIER)
- view later alarms (move "up a page") (LATER)

Figure 2-2 illustrates a typical Major alarm queue display.

3624	MainStreet	6207-	ab-cd		Alarms:8	06-MAY-9	91 1:21P
#	Date	Time	Stat	Ić	. Code	SubCode	Parameters
8 7 6 5 4 3 2	06-MAY-91 06-MAY-91 05-MAY-91 04-MAY-91 03-MAY-91 02-MAY-91 01-MAY-91 01-MAY-91	1:20P 1:18P 10:18A 9:17P 11:08P 8:03A 6:01A 5:00A	U U U A	20 17 15 13 9 6 3	Revision/Feature Mismatch Revision/Feature Mismatch Revision/Feature Mismatch Revision/Feature Mismatch Device Failed Device Failed Red Alarm Synch Source Changed	м07 м06	a,5,0 7,5,0 6,5,0 5,5,0 e,0,0 e,0,0
	.RMS MAJOR -ACK_ALL	2- 7-			3-DELETE_ALL 4-DELETE 8-CANCEL 9-QUIT		5- <b>A</b> CK 0-

Figure 2-2: Typical Alarm Queue Display

Table 2-2 explains the column headings in Figure 2-1.

Table 2-2: Column Heading Explanation for Alarm Queue Display

Column Heading	Explanation
#	The top number in this column indicates the number of the last alarm placed in the queue. Use the number appearing under "#" to identify an alarm to be acknowledged or deleted. The numbers are updated each time an alarm is deleted.
Date	The date that the alarm occurred is shown. "No Date" indicates the system was reset and the date has not yet been set via the HOUSE menu.
Time	The time the alarm occurred is shown. "A"= A.M., "P" = P.M., and "R" is for hours since the last system reset.
Stat	Stat indicates whether an alarm has been acknowledged. If an alarm has not been acknowledged, status is given as U (unacknowledged). Once the alarm is acknowledged, its status changes to A (acknowledged).
ld	Each alarm is assigned a unique identification (Id) number when it occurs. The Id is not associated with the alarm # given in Table 2-1 and does not change as the alarm is acknowledged and/or deleted.
Code	Identifies the alarm as shown in Table 2-1.
Subcode and Parameters	Usually the subcode and parameters are for use by Newbridge field service personnel only. However, some subcodes and parameters are relevant to maintenance operations, as detailed in Table 2-1.

# queue

To view an alarm 1a. To view the Major alarm queue, enter:

**ALARMS MAJOR** 

**1b.** To view the Minor alarm queue, enter:

**ALARMS MINOR** 

1c. To view the Minor alarm queue, enter:

ALARMS DIAGNOSTIC

### To view alarms recorded earlier or later

To view earlier alarms, enter: 1.

ALARMS MAJOR or MINOR or DIAGNOSTIC EARLIER

To view later (more recent) alarms, enter:

ALARMS MAJOR or MINOR or DIAGNOSTIC LATER

To delete an alarm or all alarms

You can delete a specific alarm or all the alarms in a queue.

Enter: 1.

**ALARMS** 

2. Select:

MAJOR or MINOR or DIAGNOSTIC

3. Enter:

DELETE <alarm number> or DELETE\_ALL

where the *alarm number* is the number under the "#" column in the display that identifies the alarm to be deleted

### To acknowledge an alarm or all alarms

You can acknowledge a specific alarm or all alarms in a queue.

1. Enter:

ALARMS

2. Select:

MAJOR or MINOR or DIAGNOSTIC

3. Enter:

ACK <alarm number> or ACK\_ALL

where the alarm number is the number under the "#" column in the display that identifies the alarm to be acknowledged

## 2.4 Logging Alarms

The three options for logging alarms are:

- □ logging alarms to the Network Operations Center (NOC) via the T1 link (RMT\_ON/RMT\_OFF)
- □ logging alarms to the NOC via modem (MDM\_ON/MDM\_OFF)
- logging alarms to a device (such as a printer) connected to the serial port not being used by the node management terminal (LCL\_ON/LCL\_OFF)

All three options can be active simultaneously.

Remote logging of alarms in normally done through CPSS messages.

The MDM\_ON option is available only if one of the two serial ports has been configured as CPSS\_MODEM (see Chapter B1, Serial Ports, in the Configuration manual).

The LCL\_ON option is available only if one of the two serial ports has been configured as PRINTER (see Chapter B1, Serial Ports, in the Configuration manual).

Default:

remove logging alarms to the NOC (RMT\_OFF) remove logging alarms via a modem (MDM\_OFF) remove logging alarms to a printer (LCL\_OFF)

# To configure the 1. logging of alarms

l. Enter:

ALARMS MORE LOGGING

2. Select:

RMT\_ON or RMT\_OFF MDM\_ON or MDM\_OFF LCL\_ON or LCL\_OFF

The softkey that does not appear is already selected.

### 2.5 External Alarm Indication

The presence of an unacknowledged entry in the Major or Minor alarm queue drives the system or event alarm pins on the external alarm connector (see Chapter 13, Connecting an External Alarm, in the Installation manual).

An external alarm can be:

enabled (ENABLE)disabled (DISABLE)

Default: disabled (DISABLE)

The pins on the alarm connector can be configured so an alarm is raised when the circuit:

closes (CLOSED\_CCT)

opens (OPEN\_CCT)

Default: an alarm is raised when the circuit closes (CLOSED\_CCT)

When an external alarm is generated, the alarm, "External Alarm Raised", appears in the appropriate alarm queue.

# To enable or disable the alarm connector

1. Enter:

ALARMS EXTNL\_ALRM

2. Select:

ENABLE or DISABLE

The softkey that does not appear is already selected.

3. Select:

OPEN\_CCT or CLOSED\_CCT

The softkey that does not appear is already selected.

# 3. System Diagnostics

This chapter describes system diagnostics, including:

J	the	types	of	diagnostic	tests
---	-----	-------	----	------------	-------

- enabling and disabling background diagnostics
- running specific diagnostic tests
- viewing information on diagnostic tests
- viewing and editing signalling leads on circuits
- temporarily disconnecting a circuit (busy-out)
- displaying information on modules and the Control card

## 3.1 Diagnostic Tests

The 3624 MainStreet can perform a number of system-wide and device-specific diagnostic tests, either automatically or on a directed basis. By using the NMTI, you can start and stop background diagnostics or direct the 3624 to perform a specified test repeatedly. If a test is unsuccessful, or if the time taken to complete that test exceeds the preset limit, an alarm is raised in the alarm queue.

Diagnostics do not busy out a circuit or remove it from service. If a circuit is required for a call while a test is in process, the test on that circuit is stopped. Diagnostics skip over circuits engaged in a call.

Table 3-1 lists the diagnostic tests performed by the 3624.

Table 3-1: Diagnostic Tests

Test #	Function	Description
1	Program Integrity	A checksum is performed over the processor program space.
2	RAM Integrity	A cyclical byte-wide read/write test is performed over the entire Random Access Memory (RAM).
3	NV RAM Integrity	A checksum is performed over the entire non-volatile RAM.
4	Digital Loopback	A digital loopback is performed on the information link between the interface card CODEC and the Control card.

# System background diagnostics

The system background diagnostics can be:

- → enabled (ENABLE)
- ☐ disabled (DISABLE)

Default: system background diagnostics disabled (DISABLE)

Normally, it is desirable to have background diagnostic tests running so the system keeps track of faults as they occur. If the background diagnostics are disabled and then enabled again, they resume at the test where they left off. If background diagnostics are enabled, you can stop the current test and restart the background diagnostics at Test No. 1.

## To enable or disable system background diagnostic tests

1. Enter:

**MAINT DIAG** 

2. Select:

**ENABLE or DISABLE** 

The softkey that does not appear is already selected.

3. To restart the background tests, select:

RESTART

The RESTART softkey is not available if background diagnostics are disabled.

### Circuit background diagnostics

Diagnostic tests can be configured on a specific circuit. Each circuit is configured as one of the following:

- circuit background diagnostics enabled (ENAB\_DIAG)
- circuit background diagnostics disabled (DISAB\_DIAG)

Default: circuit background diagnostics disabled (DISAB\_DIAG)



NOTE: Background diagnostics are not supported by the sub-rate and superrate circuits of the X.21 and V.35 DCMs, and the circuits of the OCU module, the DNIC module, and the RS-232 DCM.

# To enable or disable circuit background diagnostics

1. Enter:

CONFIG CIRCUIT <T1-cc> or <pp-c> <Return> MORE

2. Select:

ENAB\_DIAG or DISAB\_DIAG

The softkey that does not appear is already selected.

## 3.2 Running Specific Diagnostic Tests

You can select a specific diagnostic test to run:

- □ once (X1)
- □ ten times (X10)
- ☐ 100 times (X100)
- continuously (LOCK)

After running the test the specified number of times, the system automatically resumes the background diagnostic tests, if enabled.

If the specified circuit is busy, the NMTI displays the message, "Device momentarily unavailable for testing" until the circuit is ready to be tested, at which time the directed test is carried out.

You also can stop a directed test while it is running. If the test is running continuously (LOCK), you must manually stop it.



NOTE: Directed diagnostics are not supported by the sub-rate and super-rate circuits of the X.21 and V.35 DCMs, and the circuits of the OCU module, the DNIC modules, and the RS-232 DCM.

# To run a specific 1. diagnostic test

. Enter:

MAINT DIAG DIRECTED

The system prompts you for the test number, as given in Table 3-1.

2. Enter:

<test number> <Return>

where the test number is 1, 2, 3, or 4

If the diagnostic test is number 4, the NMTI prompts for the number of the circuit to be tested.

3. Enter:

<T1-cc> or <pp-c> <Return>

4. Select:

X1 or X10 or X100 or LOCK

# To stop a directed diagnostic test

1. Enter:

MAINT DIAG DIRECTED HALT



NOTE: Selecting UNDO\_MAINT from the MAINT menu does not stop a directed diagnostic test.

## 3.3 Viewing Diagnostics

You can view:

- the number and description of the diagnostic test currently being run (SHOW\_CUR)
- a list of all diagnostic tests supported with their corresponding test numbers (SHOW\_LIST)
- each failed circuit and the test it failed (FAULT\_LIST)

Default: no default

To determine which background diagnostic the circuit failed, check the alarm queue (see Chapter 2, Alarms, in this manual).

# To view diagnostics

1. Enter:

MAINT DIAG

2. Select:

SHOW\_CUR or SHOW\_LIST or FAULT\_LIST

If FAULT\_LIST is selected, the NMTI prompts for a module position identifier, enter:

<T1> *or* <*pp*> <Return>

The NMTI identifies the circuit(s) on the selected module that failed a test.

## 3.4 Viewing and Editing Signalling Leads

Circuits send and receive signalling information. Analog circuits send signalling information via voltage levels on the signalling leads or wires. Digital circuits send signalling information via signalling bits in the data stream.

Incoming signalling information indicates what is happening at the remote end, while outgoing signalling information transmits what is happening at the local end.

The 3624 allows you to examine incoming and outgoing signalling leads. This is a useful trouble-shooting tool for it permits you to "view" the far end conditions and determine, for example, whether the telephone is off-hook or what signal patterns are being sent out.

Outgoing signalling leads can also be changed to force conditions at the local end. For example, it may be useful for the DTUs to lose synchronization or to force a telephone to ring.

You can view the status of the signalling leads (or bits) for all circuits and change the signalling leads of some circuits.

If you attempt to view the signalling bits on T1 circuits that are part of a super-rate group, the error message, "SHOW\_SIGNL SET\_SIGNAL keys are not available when signalling is disabled", is displayed. This occurs because robbed bit signalling is off for super-rate data circuits.

If you attempt to edit the signalling bits on T1 circuits that are part of a super-rate group, the error message, "SHOW\_SIGNL SET\_SIGNAL keys are not available when signalling is disabled", is displayed. This occurs because robbed bit signalling is off for super-rate data circuits.

The abbreviation and the digital representation of the signals is displayed – a "0" indicates an off state and a "1" indicates an on state. Table 3-2 lists the signalling leads of the circuits.

**Outgoing Signalling** Circuit Incoming Signalling Leads Type Leads F-lead E&M M-lead Ringing Loop\_Current LGS Ground\_Detect Tip\_Open Reverse\_Bty Loop\_Closure LGE Ringing Tip\_Ground Ring\_Ground Forward\_Feed Reverse\_Feed Force Unsync DNIC Sync LQ1 LQ2 Not applicable Off-hook DSU Status OCU. Loopback ABCD ABCD T1

Table 3-2: Incoming and Outgoing Signalling Leads



NOTE: For T1 circuits the incoming and outgoing signalling leads are not shown if RBS\_OFF is selected.

# DNIC circuit signalling leads

The "Sync" signal indicates DTU synchronization. If synchronization is not set on (see Chapter F1, DNIC Modules, in the Configuration manual), the DTU is not synchronized and communication between the *3624 MainStreet* and the DTU is not possible.

The "LQ1" and "LQ2" signals are a noise margin (0 to 3) indicating the quality (proportional to the noise margin) of the link between the *3624 MainStreet* and the DTU. The higher the number, the higher the link quality.

When "Forced Unsync" lead is turned on, it causes the DTU to lose synchronization, the DTU regains synchronization when the lead is turned off.

The signals of the DTU corresponding to each DNIC circuit can be determined if the DTU is in synchronization. In this case, a CTRL\_LEADS softkey appears which, when selected, displays the inputs and outputs of the corresponding DTU. The output status cannot be set via the SET\_SIGNAL softkey, they can be set via the CONFIG CIRCUIT FUNCTION menu.

# To view the status of signalling leads

#### 1. Enter:

MAINT ON\_CIRCUIT <T1-cc> or <pp-c> <Return> SHOW\_SIGNL

The NMTI displays a screen similar to Figure 3-1.

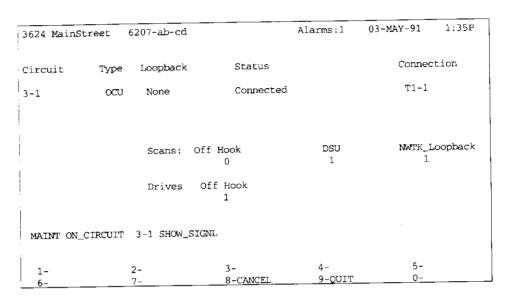


Figure 3-1: Signalling Leads Display

## Signalling bits

The outgoing signalling leads of a voice, data or T1 circuit can be edited bit-by-bit. The state of each bit can be either 0 (off) or 1 (on).

# To edit the signalling bits

1. Enter:

MAINT ON\_CIRCUIT <T1-cc> or <pp-c> <Return> SET\_SIGNAL

2. Enter the a new signal state:

<0> or <1> <Return>

The prompt to enter a new drive state remains, allowing you to change the signalling bits as many times as required.

## 3.5 Busy-out Circuits

The busy-out feature is used to temporarily place a circuit out of service. When the circuit is out of service, you can perform maintenance functions such as loopbacks. A circuit that is "busied out" is blocked from attempts to place it back in service or change any part of its configuration.

A circuit remains in the busy-out state until it is changed by the operator to the unbusy state or the system is restarted.

When a T1 circuit that is part of a super-rate group is "busied out", the disconnection is performed on all the circuits within the super-rate group. The temporary disconnection must be set on the first circuit within the group, otherwise the error message, "Maintenance cannot be performed on this type of circuit", is displayed.

Default: UNBUSY

## To busy-out a circuit

1. Enter:

MAINT ON\_CIRCUIT <T1-cc> or <pp-c> <Return> BUSY\_OUT

To remove a circuit from busy-out

1. Enter:

MAINT ON\_CIRCUIT <T1-cc> or <pp-c> <Return> UNBUSY

## 3.6 Displaying Information on Interface Modules and the Control Card

You can display information about the primary rate modules, the Control card or the Universal Interface card modules such as the module type, the module identification (ID) and the interface type. This information can be used if you need to contact your Newbridge representative when you have problems with one of the modules.

# To display module information

1. Enter:

MAINT ON\_MODULE <T1> or <CTL> or <pp> <Return>

A screen, similar to Figure 3-2, is displayed listing the module information.

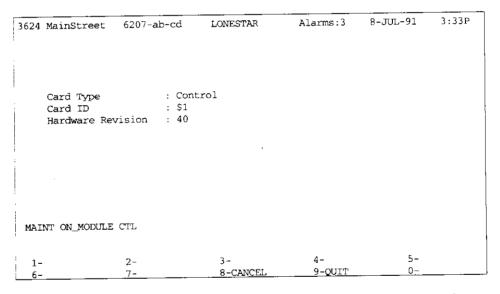


Figure 3-2: Displaying Information on Modules and the Control Card

	•	

# 4. Loopbacks

This chapter describes loopbacks, including:

voice module lo	oopbacks
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- □ DTU loopbacks
- OCU module loopbacks
- ☐ DCM loopbacks
- CSU loopbacks
- T1 circuit and link loopbacks
- DDS loopbacks
- network-directed loopbacks
- initiating and removing loopbacks for each type

## 4.1 Using Loopbacks

Loopbacks are a maintenance function used to isolate faults in equipment or transmission lines. A signal is sent out and looped back at some point in the transmission path and the outgoing signal is compared to the returning signal.

The 3624 offers several loopbacks so the signal can be returned at different points in the path. This allows you to check progressively longer sections of the transmission, knowing the fault is between the last successful loopback and the first unsuccessful loopback.

The 3624 performs unidirectional and bidirectional loopbacks on voice circuits and data circuits, as well as on individual channels on the T1 link. T1 loopbacks test the end-to-end connections over the T1 line.

All loopbacks are temporary; that is, loopback information is not stored in non-volatile memory. With some loopbacks, the signal is passed through as well as being looped back, which is indicated in the loopback diagrams.

The number of loopbacks that can be in progress simultaneously is limited to 5. If this number is reached, the loopback softkeys do not appear for the circuits without a loopback and the NMTI displays a cautionary message.

Loopback LEDs on the Control card are lit when there is a loopback on any circuit or the T1 line (see Chapter 1, Visual Indicators, in this manual).



CAUTION: Initiating a loopback causes all calls in progress on the affected circuit to be dropped. No new calls can be initiated while the circuit is looped back.

## 4.2 Voice Interface Module Loopbacks (E&M, LGS, LGE, and MRD)

### Loopback A

Loopback A for voice interface modules is a unidirectional loopback that extends from the digital cross-connect matrix (DX) located on the Control card. The signal loops back at the digital side of the coder-decoder (CODEC) on the voice interface module (see Figure 4-1).

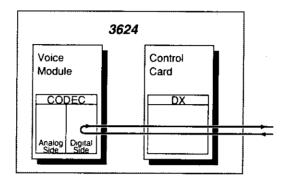


Figure 4-1: Loopback A, Voice Interface Modules

### Loopback B

Loopback B is a unidirectional loopback that extends from the DX and loops back at the analog side of the CODEC (Figure 4-2).

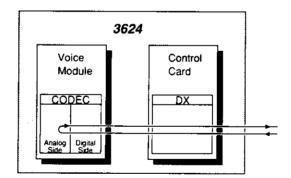


Figure 4-2: Loopback B, Voice Interface Modules



NOTE: Loopback B is not supported for E&M circuits configured for 4-wire. Signal gain may be produced during a Loopback B on an LGS circuit.

### Loopback C

Loopback C is a bidirectional loopback. Unlike the unidirectional loopbacks, where the signal is looped and returned to the origin, the end-to-end signal is interrupted and looped back to each end. See Figure 4-3.

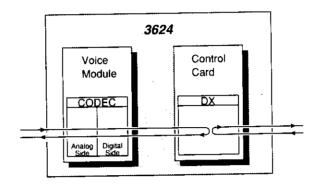


Figure 4-3: Loopback C, Voice Interface Modules

# To initiate a voice module loopback

1. Enter:

MAINT ON\_CIRCUIT <pp-c> <Return>

2. Select:

LOOPBACK\_A or LOOPBACK\_B or LOOPBACK\_C

# To remove loopbacks

1a. To remove a single loopback, enter:

MAINT ON\_CIRCUIT <pp-c> <Return> UNDO\_LPK

Selecting QUIT or CANCEL does not remove loopbacks.

1b. To remove all loopbacks, enter:

MAINT UNDO\_MAINT

Selecting QUIT or CANCEL does not remove loopbacks.

## 4.3 Loopbacks for 2601, 2602 and 2603 DTUs

#### Loopback A

For 2601, 2602, and 2603 DTUs, loopback A occurs on both lines (Port A and Port B) simultaneously. Loopback A extends from the digital cross-connect matrix (DX) on the Control card and loops back on the DNIC's module header (see Figure 4-4).

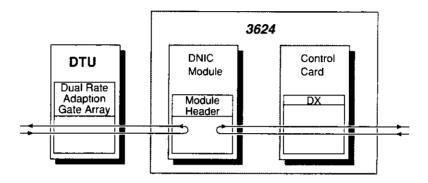


Figure 4-4: Loopback A, 2601, 2602 and 2603 DTUs

If loopback A is present on a DNIC circuit, no loopbacks are available for the other circuit on the module.

When loopback A is undone, communication between the DNIC circuit and the DTU must be re-established. This means the softkeys LOOPBACK\_B and LOOPBACK\_C are not available for approximately 4 seconds after the end of Loopback A. Refresh the screen to see the softkeys (press ESC and R).

### Loopback B

For the 2601, 2602 and 2603 DTUs, B is a bidirectional loopback that can be initiated on either Port A or B. The signal from the Control card is looped back in the DTU's Dual Rate Adaption Gate Array (DRAGA) chip, on the side closest to the DNIC module.

The signal from the data device is looped back in the DRAGA chip also, but on the inside of the DRAGA (see Figure 4-5).

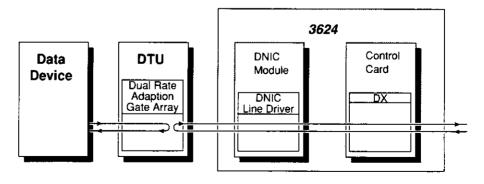


Figure 4-5: Loopback B, 2601, 2602 and 2603 DTUs

### Loopback C

For the 2601, 2602 and 2603 DTUs, loopback C is a bidirectional loopback. The signal from the Control card is looped back within the DTU inside the DRAGA.

The signal from the data device is looped back in the DTU at the DRAGA, on the side closest to the data device (see Figure 4-6).

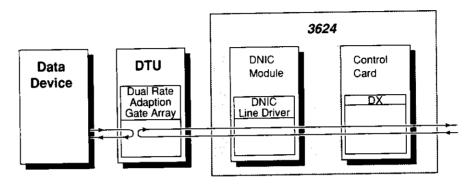


Figure 4-6: Loopback C, 2601, 2602 and 2603 DTUs

To initiate a 2601, 1. 2602, and 2603 DTU loopback Enter:

MAINT ON\_CIRCUIT <pp-A> or <pp-B> <Return>

2. Select:

LOOPBACK\_A or LOOPBACK\_B or LOOPBACK\_C

# To remove loopbacks

1a. To remove a single loopback, enter:

MAINT ON\_CIRCUIT <pp-A> or <pp-B> <Return> UNDO\_LPK

1b. To remove all loopbacks, enter:

MAINT UNDO\_MAINT

Selecting QUIT or CANCEL does not remove loopbacks.

## 4.4 Loopbacks for the 2606 DTU

### Loopback A

Loopback A occurs on port A and port B simultaneously. loopback A extends from the digital crosss-connect matrix (DX) on the Control card and loops back on the DNIC line driver located on the DNIC module. See Figure 4-7.

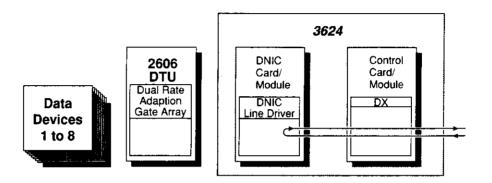


Figure 4-7: Loopback A, 2606 DTU

### Loopback B

Loopback B is a bidirectional loopback that can be initiated from either circuit A or circuit B. The signal from the Control card is looped back within the DTU in the DRAGA chip, on the side closest to the DNIC card. The signals from the data devices connected to the selected aggregate port are looped back on the side closest to the DNIC card. See Figure 4-8.

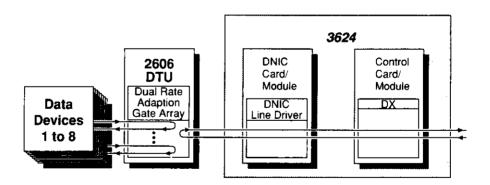


Figure 4-8: Loopback B, 2606 DTU

## Loopback C

Loopback C is a bidirectional loopback that can be initiated from either port A or port B. The signal from the Control card is looped back within the DTU inside the DRAGA chip. The signals from the data devices connected to the selected aggregate port are looped back in the DTU at the DRAGA on the side closest to the data device. See Figure 4-9.

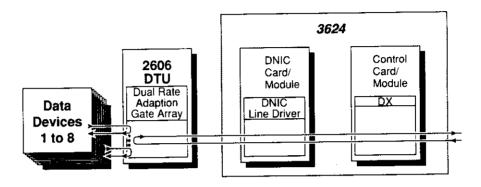


Figure 4-9: Loopback C, 2606 DTU

# To initiate a 2606 1. DTU loopback

Enter:

MAINT ON\_CIRCUIT <pp-A> or <pp-B> <Return>

2. Select:

LOOPBACK\_A or LOOPBACK\_B or LOOPBACK\_C

# To remove loopbacks

1a. To remove a single loopback, enter:

MAINT ON\_CIRCUIT <pp-A> or <pp-B> <Return> UNDO\_LPK

1b. To remove all loopbacks, enter:

MAINT UNDO\_MAINT

Selecting QUIT or CANCEL does not remove loopbacks.

## 4.5 Loopbacks for the 2608 and 2610 DTUs

These loopbacks are different than the 2601, 2602 and 2603 loopbacks. For 2608 and 2610 DTUs, the selection of port A via the NMTI accesses the aggregate port A on the DTU. The selection of port B simultaneously accesses the 8 asynchronous ports on the other side of the DTU.

# Loopback A on port A

Loopback A occurs on port A only. Loopback A is a unidirectional loopback that extends from the digital cross-connect matrix (DX) and loops back on the DNIC module (see Figure 4-10).

If loopback A is present on a DNIC circuit, no other loopbacks are available for the other circuit on the module.

When loopback A is undone, communication between the DNIC circuit and the DTU must be re-established. This means the softkeys LOOPBACK\_B and LOOPBACK\_C are not available for approximately 4 seconds after the end of loopback A. Refresh the screen to see the softkeys (press ESC and R).

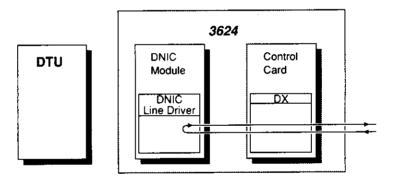


Figure 4-10: Loopback A on Port A, 2608 and 2610 DTUs

# Loopback B on port A

Loopback B:port Ais a bidirectional loopback. It extends from the DX and loops back on the DRAGA in the DTU. The signal from all 8 data devices are looped back on the inside of the DRAGA (see Figure 4-11).

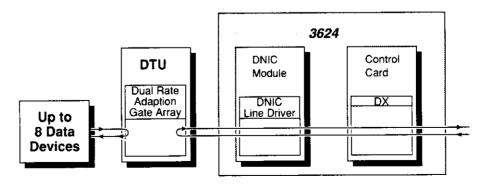


Figure 4-11: Loopback B on Port A, 2608 and 2610 DTUs

## Loopback B and C on port B

When loopback B or C is selected for port B, a bidirectional loopback is initiated. The signal extending from the DX is looped back in the DTU. This loopback occurs at the microprocessor in the DTU and is a software loopback.

The signals extending from the 8 data devices are looped back simultaneously at the 8 asynchronous interfaces on the DTU. These loopbacks are hardware loopbacks (Figure 4-12).

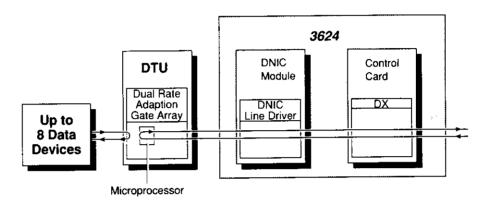


Figure 4-12: Loopback B and C on Port B, 2608 and 2610 DTUs

# Loopback C on port A

Loopback C is a bidirectional loopback. The signal from the Control card is looped back within the DTU inside the DRAGA (see Figure 4-13).

The signals from the eight data devices are looped back in the DTU at the DRAGA, on the side closest to the data device.

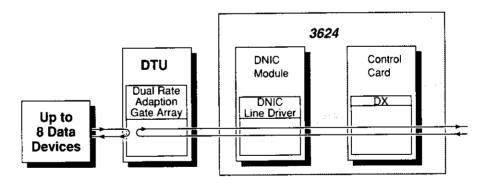


Figure 4-13: Loopback C on Port A, 2608 and 2610 DTUs

To initiate a 2608 1. or 2610 DTU loopback

1. Enter:

MAINT ON\_CIRCUIT <pp-A> or <pp-B> <Return>

2. Select:

LOOPBACK\_A or LOOPBACK\_B or LOOPBACK\_C

# To remove loopbacks

1a. To remove a single loopback, enter:

MAINT ON\_CIRCUIT <pp-A> or <pp-B> <Return> UNDO\_LPK

**1b.** To remove all loopbacks, enter:

MAINT UNDO\_MAINT

Selecting QUIT or CANCEL does not remove loopbacks.

## 4.6 OCU Module Loopbacks

# OCU module loopback

The OCU module loopback is a unidirectional loopback. The loopback occurs at the initiating node, then the signal passes through the Control card and is looped back on the OCU module (see Figure 4-14).

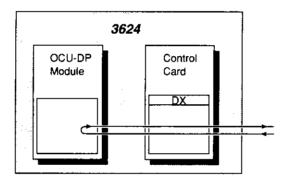


Figure 4-14: OCU Module Loopback

#### Loopback C

Loopback C is a bidirectional loopback. One section of the signal is looped back at the Control card and returns toward the network. The section of the signal coming from the data device passes through to the Control card and loops back within the Control card (see Figure 4-15).

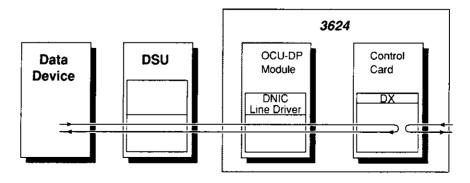


Figure 4-15: Loopback C, OCU Module

# To initiate an OCU loopback

1. Enter:

MAINT ON\_CIRCUIT <pp-c> <Return>

2. Select:

OCU LPBK or LOOPBACK\_C

# To remove OCU loopbacks

1a. To remove a single loopback, enter:

MAINT ON\_CIRCUIT <pp-c> <Return> UNDO\_LPK

Selecting QUIT or CANCEL does not remove loopbacks.

1b. To remove all loopbacks, enter:

MAINT UNDO\_MAINT

Selecting QUIT or CANCEL does not remove loopbacks.

## 4.7 DCM Loopbacks

The RS-232 DCM supports loopbacks B and C.

Both the sub-rate and super-rate circuits of the X.21 and V.35 DCMs support loopback B and C.

### Loopback B

Loopback B is a bidirectional loopback that extends from the DX and loops back in the gate array as close as possible to the network side (see Figure 4-16).

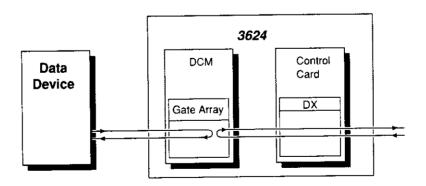


Figure 4-16: Loopback B, RS-232, X.21 and V.35 DCMs

### Loopback C

Loopback C is a bidirectional loopback that extends from the DX and loops back in the gate array as close as possible to the attached data device (see Figure 4-17).

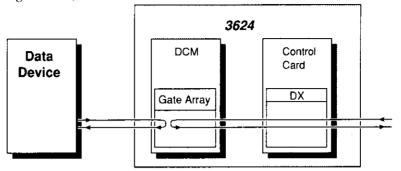


Figure 4-17: Loopback C, RS-232, X.21 and V.35 DCMs



CAUTION: Initiating a loopback causes all calls in progress on the affected circuit to be dropped. No new calls can be initiated on the circuit while it is looped back.

# To initiate a DCM loopback

1. Enter:

MAINT ON\_CIRCUIT <pp-c> <Return>

2. Select:

LOOPBACK\_B or LOOPBACK\_C

# To remove DCM loopbacks

**1a.** To remove a single loopback, enter:

MAINT ON\_CIRCUIT <pp-c> <Return> UNDO\_LPK

Selecting QUIT or CANCEL does not remove loopbacks.

**1b.** To remove all loopbacks, enter:

MAINT UNDO\_MAINT

Selecting QUIT or CANCEL does not remove loopbacks.

## 4.8 T1 Circuit Loopbacks

### Loopback A

Loopback A can only be selected for one T1 circuit at a time. When loopback A is selected, that circuit is looped back on the T1 chip of the Control card (see Figure 4-18).

Loopback A cannot be performed on super-rate T1 circuits. If loopback A is attempted on a super-rate circuit, the error message, "Cannot be performed on this type of circuit", is displayed.

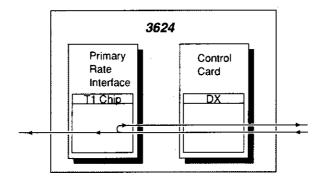


Figure 4-18: Loopback A, T1 Circuit

### Loopback C

Loopback C is a bidirectional loopback. Unlike the unidirectional loopbacks, where the signal is looped and returned to the origin, the end-to-end signal is interrupted and looped back to each end.

The loopback occurs at the node where the loopback was initiated. The signal is looped back at the Control card (see Figure 4-19).

When loopback C is initiated on a T1 circuit that is part of a super-rate group, it is performed on all circuits in the group. The first circuit of the super-rate group must be identified when the loopback is performed, otherwise the error message, "Maintenance cannot be performed on this type of circuit" is displayed.

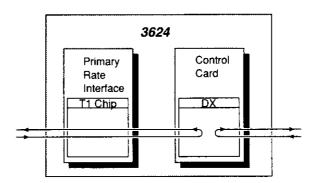


Figure 4-19: Loopback C, T1 Circuit

# To initiate a T1 circuit loopback

1. Enter:

MAINT ON\_CIRCUIT <T1-cc> <Return>

2. Select:

LOOPBACK\_A or LOOPBACK\_C

## To remove a T1 circuit loopback

1a. To remove a single loopback, enter:

MAINT ON\_CIRCUIT <T1-cc> <Return> UNDO\_LPK

**1b.** To remove all loopbacks, enter:

MAINT UNDO\_MAINT

Selecting QUIT or CANCEL does not remove loopbacks.

## 4.9 T1 Link Loopbacks

T1 link loopbacks – equipment loopback and the line loopback –are used to test the end-to-end connections. When these loopbacks are initiated, the entire T1 link is looped back. All calls in progress are dropped, so T1 loopbacks should be performed only in extreme cases or when node traffic is minimal.

### Equipment Loopback

With the equipment loopback, the signal from the Control card is looped back on the T1 interface (see Figure 4-20).

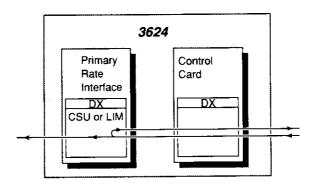


Figure 4-20: T1 Equipment Loopback

#### Line Loopback

The signal received from the T1 line is looped back at the Line Interface Module (LIM) on the Control card (Figure 4-21). The line loopback is not available if the LIM is not installed.

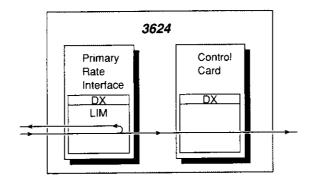


Figure 4-21: T1 Line Loopback



CAUTION: Initiating a loopback causes all calls in progress to be dropped. No new calls can be initiated on the line while it is looped back.

## To initiate a T1 link loopback

1. Enter:

MAINT ON\_MODULE <T1> <Return> LOOPBACK

2. Select:

**EQUIPMENT** or LINE

## To remove a T1 link loopback

1. Enter:

MAINT ON\_MODULE <T1> <Return> UNDO\_LPK

## 4.10 DDS Loopbacks

If you subscribe to AT&T's Dataphone Digital Service (DDS), the DDS network may occasionally perform loopbacks on a per channel basis to assist in fault isolation. The three types of DDS loopbacks are:

- ☐ CSU (Channel Service Unit) loopback
- ☐ DSU (Data Service Unit) loopback
- □ OCU (Office Channel Unit) loopback

If a DDS loopback is being performed, "DDS" followed by the type of loopback is listed under the "Loopback" heading in the data area of the screen when ON\_CIRCUIT is selected.

You cannot "undo" a DDS loopback nor can you initiate loopbacks A, B or C when a DDS loopback is in progress. The DDS loopback over-rides any active local loopbacks (A, B or C).

Figure 4-22 shows an OCU loopback.

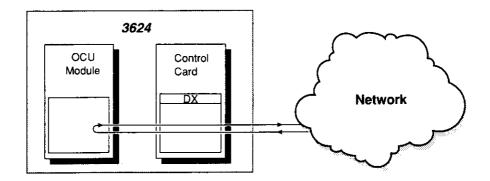


Figure 4-22: OCU Loopback, Network-directed

## 4.11 Network Loopbacks

If a CSU module is installed on the Control card, the T1 link also supports a network-requested/directed CSU (Channel Service Unit) loopback as illustrated in Figure 4-23

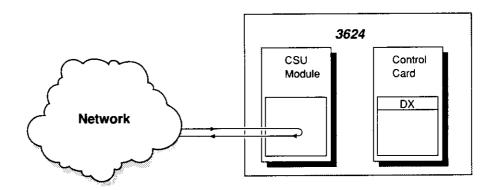


Figure 4-23: CSU Loopback, Network-directed

If CSU trunk conditioning is enabled (see Chapter D3, Trunk Conditioning, in the Configuration manual), upon detection of a network-requested loopback the 3624 MainStreet raises an alarm and removes the link from service.

If CSU trunk conditioning is disabled and the 3624 MainStreet detects a network-requested loopback, it raises an alarm but leaves the link in service.

## 5. Database Management

This	chapter describes database management, including:
ב ב	viewing information on the system's non-volatile memory backing up the 3624 MainStreet's configuration settings verifying the backup file restoring the backup file to the system

## 5.1 Preserving Your Configuration Database

The 3624 MainStreet configuration settings are stored in Non-volatile Memory (NVM) on the Control card. You can view information about the NVM.

Using a terminal running NMTI, you can make a backup file of the configuration settings and send it to any RS-232 compatible device, such as a personal computer (PC). A 4600-series network manager with access to the 3624 MainStreet, can make and store a backup copy of the configuration settings.

You can use a backup file (loaded from a PC or 4600-series network manager) to replace a damaged system configuration file or to save time when reconfiguring the system after new software is loaded (system initialization erases the contents of the NVM). When the configuration database is restored from a backup file, the node name and node number are not reset, but are preserved from the previous configuration. All passwords return to the default (MAINSTREET) but the access levels are restored from the backup file.

The NMTI can be used to verify that the backup file is identical to the current configuration settings.

With a 4600 connected directly to the 3624 (through a serial port configured as CPSS), you can create a backup file, verify it against the current configuration database, and use it to restore the 3624.

With a 4600 connected indirectly to the 3624 (through a serial port configured as CPSS\_MODEM), you can create a backup file and verify it, but you cannot restore the configuration database.

## 5.2 Viewing NVM Information

You can display information on the size and usage of the Non-volatile Memory (NVM) blocks. The following data is displayed:

- → NVM block size
- the number of blocks in use
- ☐ the number of free blocks
- the number of bad blocks detected
- ☐ the total number of NVM blocks

If the NVM was corrupted, information on the repaired block(s) also is displayed. If bad blocks exist but no repair information is listed, the bad blocks occurred in unused space. Reset the NVM to the default values.

## To display NVM 1. information

## Select:

MAINT MORE NVM\_DATA

The NMTI displays a screen similar to Figure 5-1.

3624 MainStreet	6207-ab-cd		Alarms:5	02-MAY-91	3:27P
Block Size	:	48			
Allocated Block	ks :	97			
Free Blocks	;	400			
Bad Blocks	:	0			
Total Blocks	:	497			
MAINT NVM_DATA					
MAINI NVM_DATA					
1-	2-	3-	4-	5-	
6	7-	8-CANCEL	9-QUIT	0 -	

Figure 5-1: Screen Display of NVM Data



CAUTION: Resetting the NVM over-writes the current configuration database with the default configuration database. If you plan to restore the database, ensure that you have an up-to-date backup file (see the next section) before proceeding.

## To reset the NVM

- 1. Disconnect any PCs or 4600-series network managers from the 3624 MainStreet.
- 2. Select:

MAINT MORE RESTORE PROCEED CANCEL

3. Check the NVM as described above.

If no bad blocks appear, restore the configuration database as described in section 5.5, "Restoring Configuration Settings", in this chapter.

If bad blocks reappear, you will have to replace the NVM. Contact your Newbridge representative.

## 5.3 Backing Up the Configuration Database

When the backup option is initiated from an NMTI session, the backup option allows you to create a backup copy of the 3624 configuration database on an external device, such as a PC. A PC is required to receive the database information and a terminal is required for controlling the NMTI session.

When the backup commands are issued from a 4600, the backup file is saved to the computer running the 4600 program.

## To back up the configuration database

1. Make sure the backup device is ready to receive the data transfer.

For example, a PC needs to be running terminal emulation software and the configuration setting must be stored in an ASCII file. The exact procedure varies with the software used.

2a. If the backup is to a PC running communications software, select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 PORT\_TYPE VT100

**2b.** If the backup is to a PC running 4600-series network manager software, select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 PORT\_TYPE CPSS

**2c.** If the backup is to a *4600*-series network manager via modem and the PSTN, select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 PORT\_TYPE CPSS\_MODEM

- 3. Connect the external device to be used for backup to the serial port configured in Step 2.
- 4. Select the baud rate for the backup procedure. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 BAUD RATE

The same baud rate must be used for both the backup and verify procedures.

5. Select:

300 or 600 or 1200 or 2400 or 4800 or 9600

6. For baud rates of 2400, 4800, or 9600, set the flow control. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 FLOW\_CTRL

7. Enter:

XON/XOFF or DTR

DTR flow control is supported by Serial Port 2 only. If the device is not using flow control, make sure that it is able to receive the data continuously, regardless of the baud rate selected for the transfer.

8. Enter:

MAINT MORE BACKUP

The backup procedure lasts a few minutes depending upon the baud rate selected and the complexity of the configuration database.

It is a good idea to make a copy of the newly-created backup file in case the backup file becomes corrupted.

**9.** Select CANCEL if you want to abort the procedure.



NOTE: While a backup is in progress, calls in progress continue and new calls can be initiated.

## 5.4 Verifying the Backup File

You can verify whether the backup file held by an external device is identical to the current configuration settings stored on the system. You can perform file verification whenever the external device holding the backup file is accessible to the system.



NOTE: The same band rate must be used for both the backup and verify procedures. The band rate must be equal to or greater than 300 b/s.

## To verify the backup file

- Make sure the external device is connected to the serial port not being used by the node management terminal.
- 2a. If the verification is to a PC running communications software, select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 PORT\_TYPE VT100

**2b.** If the verification is to a PC running 4600-series network manager software, select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 PORT\_TYPE CPSS

**2c.** If the verification is to a 4600-series network manager via modem and the PSTN, select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 PORT\_TYPE CPSS\_MODEM

3. Select the baud rate for the backup procedure. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 BAUD RATE

4. Select:

300 or 600 or 1200 or 2400 or 4800 or 9600

5. For baud rates of 2400, 4800, or 9600, set the flow control, enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 FLOW\_CTRL

6. Enter:

XON/XOFF or DTR

DTR flow control is supported by Serial Port 2 only. If the device is not using flow control, make sure that it is able to receive the data continuously, regardless of the baud rate selected for the transfer.

#### 7. Enter:

## MAINT MORE VERIFY

When the verification procedure is complete, the 3624 displays a message, telling you whether the two databases are identical. If they are identical, the message "Database successfully verified", is displayed. If they are not identical, the message, "Database Verify Error" is displayed.

## 5.5 Restoring Configuration Settings

You can load the configuration data from a backup file to restore the 3624 *MainStreet* or to configure a replacement Control card. When flow control is used the restore procedure is requires baud rates above 2400 b/s.



CAUTION: The system is disabled while configuration settings are being restored. All calls in progress are dropped and no new calls can be initiated. We recommend you restore configuration settings when node traffic is minimal.

# To restore configuration settings

1. Prepare the external device to send the backup file to the *3624*.

The exact steps taken depend on the type of the external device used to store the backup file.

**2a.** If the backup is from a PC running communications software, select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 PORT\_TYPE VT100

**2b.** If the backup is from a PC running 4600-series network manager software, select:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 PORT\_TYPE CPSS

3. Select the baud rate for the backup procedure. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 BAUD RATE

The same baud rate must be used for both the backup and restoring procedures.

4. Select:

300 or 600 or 1200 or 2400 or 4800 or 9600

5. For baud rates of 2400, 4800, or 9600, set the flow control. Enter:

HOUSE SER\_PORT\_1 or SER\_PORT\_2 FLOW\_CTRL

## 6. Enter:

XON/XOFF or DTR

DTR flow control is supported by Serial Port 2 only. If the device is not using flow control, make sure that it is able to receive the data continuously, regardless of the baud rate selected for the transfer.

## 7. Enter:

## MAINT MORE RESTORE

If the data transfer finishes without errors, the system restarts automatically with the new configuration. If an error occurs during the transfer, the system erases the new configuration data and reloads the factory-set (default) configuration.

8. To abort the restoration of configuration settings, select:

**CANCEL** 

Configuration settings are reset to their default settings.

. when		

# 6. Viewing CPSS Routing Information

This chapter describes CPSS routing information, including:

viewing information on all nodes the 3624 communicates with over a
specified circuit



NOTE: The 4602 MainStreet Intelligent NetworkStation only recognizes software generic 6207 of the 3624 MainStreet.

## 6.1 The Routing Table

Each 3624 MainStreet that is part of a Newbridge network sending CPSS messages, constructs a routing table containing information on the network nodes.

The 3624 knows which nodes it can send CPSS messages to, how far it is from those nodes, and which route it should use to send the messages. The routing table information is used to assist in diagnostic and maintenance operations.

You can display three tables that show different routing information, including:

	all the	nodes	in	the	network	(SHOW	NODES)
_	an arc	110440	4.		1.00	(	

- all the nodes in the network that are a specified number of hops away from the 3624 (HOPS\_AWAY)
- □ all the nodes in the network that the 3624 communicates with using a specific circuit (VIA\_PATH)

In each case, you specify a node number. The presented table includes all nodes with a node number equal to or greater than the number specified.

There may be more routing information than can be displayed on a single screen. To view information on additional nodes, enter a higher or lower node number.

## 6.2 Viewing Network Nodes

Figure 6-1 illustrates a simple Newbridge network on which the following information is based.

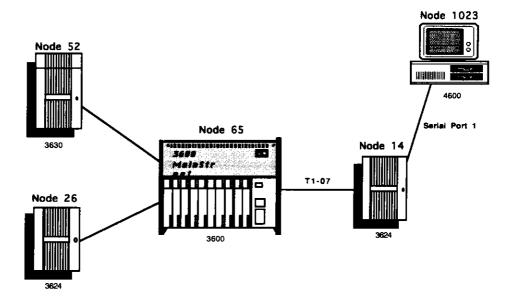


Figure 6-1: Sample Newbridge Network

A hop is equivalent to one CPSS link to a node and is independent of physical distance. For example, if messages sent from node 14 to node 26 travel through a link to node 65, and through another link to node 26, then node 26 is 2 hops away from node 14.

To view the routing table information

### 1. Enter:

MAINT MORE VIEW\_NET

To display all nodes in the network

## 1. Enter:

MAINT MORE VIEW\_NET SHOW\_NODES

The system prompts you to enter a node number from which to start searching for routing table information.

## 2. Enter:

<node number> <Return>

The NMTI displays a screen similar to the one shown in Figure 6-2, where the node number entered was 3.

3624 1	MainSt	reet	6207-al	o-cd			Ala	cms:2	04-MA	Y-91	9:06A
Node:	14	Node	s in Netwo	ork:	5						
Node	Hops	Cl	Circuit	Node	Hops	Cl	Circuit	Node	Hops	C1	Circuit
65 52	1 2		T1-07	26	2	0	т1-07	1023	1	0	SP1
				a 3							
MAINT	VIEW_	NET	SHOW_NODE:	5 3							
1- 6-			2- 7-		3-	ANCEL		4- 9-OUIT		5- 0-	

Figure 6-2: SHOW\_NODES Display

The line at the top of the data area indicates the 3624's node number and the number of the nodes in the network.

The system displays information for the specified node and for all nodes in the routing table that have a higher (numerically larger) node number.

The NMTI displays a message if the table contains no entries meeting this criteria.

Table 6-1 explains the column headings displayed in Figure 6-2.

Table 6-1: Display Headings

Column Heading	Description
Node	Indicates the node number.
Hops	Gives the node's distance in hops from the 3624 MainStreet.
CI	Indicates the clock class of the node. The 3624 MainStreet's clock class is always 0.
Circuit	Indicates the circuit the 3624 MainStreet is using to transmit CPSS messages. "SP1"stands for Serial Port 1.

To view nodes a specified number of hops away

1. Enter:

MAINT MORE VIEW\_NET HOPS\_AWAY

The NMTI prompts you to enter the number of hops.

2. Enter:

<number of hops> <Return>

The system prompts you to enter a node number from which to start searching for routing table information.

#### 3. Enter:

<node number> <Return>

A table similar in structure to the SHOW\_NODES table is displayed (see Figure 6-2). The table contains information for all nodes with the specified node number and higher that are the specified number of hops away from the 3624.

The NMTI displays a message if the table contains no entries meeting this criteria.

There may be more routing information than can be displayed on a single screen. To view information on additional nodes, enter a higher or lower hop number.

# To display the nodes within a specific path

## 1. Enter:

MAINT MORE VIEW\_NET VIA\_PATH

The NMTI prompts you to enter a circuit identifier.

#### 2. Enter:

<pp-c> <Return>

The NMTI prompts you for the node number from which to start searching for routing table information.

#### 3. Enter:

<node number> <Return>

A table similar in structure to the SHOW\_NODES table is displayed (see Figure 6-2). The table contains information on all nodes having the specified node number and higher to which the 3624 can send CPSS messages via the specified path.

The NMTI displays a message if the table contains no entries meeting this criteria.

## 7. Hardware Maintenance

This chapter describes hardware maintenance, including:

- ☐ testing power rail voltages
- testing and replacing the fuse

## 7.1 Testing the Voltages of the Power Rails

The voltages on the power rails are measured between the two male connectors on any module position on the Interface card.

Using a voltmeter you can test the voltage between ground and pins 1, 5 and 6 on connector A, and ground and pins 15, 17, 19, and 22 on connector B.

Figure 7-1 shows the pin locations on the connectors.

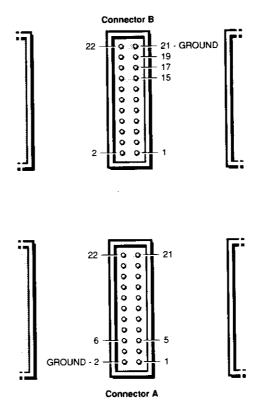


Figure 7-1: Power Rail Test Points

Table 7-1 lists the expected voltages and the tolerances for the pins.

Table 7-1: Power Rail Voltages and Tolerances

	Connector A			Connector B	
Pin	Voltage	Tolerance	Pin	Voltage	Tolerance
1	+5 V DC	+/-5 %	15	RINGING 35-75 Vrms AC	
5	-5 V DC	+/-5 %	17	+15 V DC	+/-5 %
6	+2.5 V DC	+/-0.005 %	19	-15 V DC	+/-5 %
	•		22	+5 V DC	+/-5 %

## 7.2 Testing and Replacing the Fuse (AC Power Supply), Wall-mount Unit

The fuse for the 3624 is a slow-blow type with a 5 A/250 V rating.



WARNING: To ensure continued fire protection, the replacement fuse must be a 5 A/250 V slow-blow type.

To test and replace the fuse in the wall-mount unit

- 1. Unlock the side door.
- 2. Turn off the 3624 MainStreet.
- 3. Disconnect the power supply from its power source by unplugging the power cord from the AC source and then unplugging the power cord from the power supply.
- 4. Undo the two screws holding the chassis cover in place.
- 5. Undo the two screws holding the Interface card in place.

Swing the Interface card out of the way.

6. With a small blade screwdriver, pry the fuse holder away from the power section.

See Figure 7-2 for the location of the fuse holder and Figure 7-3 for removing the fuse holder.

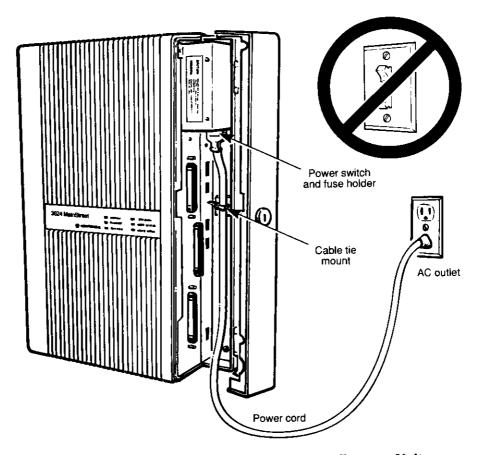


Figure 7-2: Location of the Fuse Holder, Wall-mount Unit



Figure 7-3: Removing the Fuse Holder

 Lift up on the tab and pull the fuse compartment clear of the fuse holder (see Figure 7-4).

Remove the fuse.

- 8. Check the fuse for continuity.
- **9a.** Re-install the fuse if it passes the continuity check.
- **9b.** Replace the fuse if it fails the continuity check.

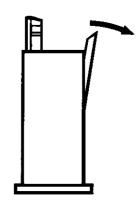


Figure 7-4: Fuse Holder

- 10. Re-assemble the fuse holder and reinstall it in the panel.
- **11.** Swing the Interface card back into place and secure it with the two screws.
- 12. Close the chassis cover and secure it with the two screws.
- 13. Reconnect the power cord and turn on the power switch.
- **14.** Make sure the unit completes its start-up diagnostics (see Chapter 12, Powering Up the System, in the Installation manual).
- 15. Close and lock the side door.

		•



Newbridge has attempted to accurately describe the intended functionality and operational procedures of this product. However, Newbridge does not warrant that the product will meet your particular requirements or that the product will not be subject to modifications.

Selected functionality may not be available in this release. Please contact your Newbridge regional sales office for specific release dates.

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# 3624 MainStreet Intelligent T1 Channel Bank

Release 7 Generic 6107/6207

Quick Reference Guide





## **Foreword**

The documentation set of the 3624 MainStreet Intelligent T1 Channel Bank contains the following manuals:

	Installation (Part number 95-B200-01-00-B)
	Configuration (Part number 95-B400-01-00-B)
	Maintenance (Part number 95-B500-01-00-B
	Ouick Reference Guide (Part number 95-B450-01-00-B)
	Node Configuration Forms (Part number 95-B460-01-00-B)
	Ordering Information (Part number 95-B050-01-00-B
ū	Index (Part number 95-B005-01-00-B)
	Content Summary (Part number 95-B000-01-00-B)
	•

**Installation:** This manual provides the instructions required to install and set up the 3624.

**Configuration:** This manual provides the instructions required for all configuration operations for the 3624.

**Maintenance:** This manual explains all maintenance functions and how to perform them.

**Node Configuration Forms:** This manual contains a series of forms to fill out for planning and recording the configuration settings.

**Ordering Information:** This manual lists the available 3624 parts and their ordering numbers.

**Index:** This manual contains the indexes for the Installation, Configuration and Maintenance manuals.

Content Summary: This manual provides a listing of the main content of the manuals in the documentation set.

## Quick Reference Guide

This manual contains a summary of the configuration and maintenance commands.

Not all 3624 MainStreet systems include all of the components or features described in this manual. The components included and the features supported depend on the type of system and the generic software. This documentation set describes software generics 6107 and 6207, Release 7.

This documentation set describes the management of the 3624 node using the NMTI. A node management session can be initiated from the 4600 MainStreet family of network managers. If you are using a network manager, the menus and screens displayed by the network management software are the similar to those described in this documentation. Refer to the 4600 documentation for more detailed information.

## **Symbols**

Several symbols are used in the 3624 documentation to draw your attention to information of special note. These symbols and their use are demonstrated below.



DANGER: Danger indicates that the described activity or situation may pose a threat to personal safety.



WARNING: A warning indicates that the described activity or situation may/will cause equipment damage.



CAUTION: A caution indicates that the described activity or situation may/will cause service interruption.



NOTE: Notes provide information that is or may be of special interest.

## **Table of Contents**

Foreword	
O 11 Policina Crido	iii
Symbols	i v
Table of Contents	
1. Softkey Summary	
O1 Main Many	1-1
Configuring the Module Positions	,
O2 Module Configuration Display Menu	
O4 Cross-connecting Circuits	,,
OF Configuring of System Timing	
Configuring Voice and T1 Circuits	1-3
O7 Configuring Data Circuits	1-0
O9 Maintenance Mentl	1-0
OO Alarms Menu	1-9
O10 House Menu	1-10
Q11. Access Level Settings (Level 5 Users Only)	1-11
2. Loopback Summary	
7.1 Voice Interface Module Loophacks (E&M, LGS, LGE, and MKD)	2-1
2.2 I combacks for 2601, 2602 and 2603 DTUs	,Z-2
2.2 Leaphacks for the 2606 DTU	∠~3
2.4 I combacks for the 2608 and 2610 DTUs	
2.5 OCT Module Loopbacks	∠-5
27 DCM Loophacks	
2.7 T1 Circuit Loophacks	
7 P T1 I ink I oonbacks	
2.0 Notwork Loophacks	. , ∠ – ∢
2.10 DDS Loopbacks	2-9

## 3. Command Summary

## **List of Figures**

#### **Figure** Title 2-1 Loopback A, Voice Interface Modules ......2-1 2-2 Loopback B, Voice Interface Modules ......2-1 2-3 Loopback C, Voice Interface Modules ......2-2 2-4 Loopback A, 2601, 2602 and 2603 DTUs ......2-2 2-5 Loopback B, 2601, 2602 and 2603 DTUs.....2-2 2-6 Loopback C, 2601, 2602 and 2603 DTUs.....2-3 2-7 Loopback A, 2606 DTU......2-3 2-8 Loopback B, 2606 DTU ......2-3 2-9 Loopback C, 2606 DTU ......2-4 2-10 Loopback A, 2608 and 2610 DTUs.....2-4 2-11 Loopback B, 2608 and 2610 DTUs.....2-4 2-12 Loopback B and C, 2608 and 2610 DTUs.....2-5 2-13 Loopback C, 2608 DTU and 2610 DTUs......2-5 2-14 OCU Module Loopback ......2-5 2-15 Loopback C, OCU Module ......2-6 2-16 Loopback B, RS-232, X.21 and V.35 DCMs......2-6 2-17 Loopback C, RS-232, X.21 and V.35 DCMs......2-6 2-18 Loopback A, T1 Circuit ......2-7 2-19 Loopback C, T1 Circuit......2-7 2-20 2-21 T1 Line Loopback......2-8 2-22 CSU Loopback, Network-directed ......2-8 2-23 OCU Loopback, Network-directed.....2-9

## Softkey Summary

## Key

ONE\_KEY/ANOTHER\_KEY\* = toggle softkey (generally – some softkeys have obliques in them). The first key is the one you'll see; the second key is the default (the one selected when you start up the system).

- \* = default
- = a softkey that includes an oblique

```
<Word> = entry of a key with a name (e.g., <Return>, <Escape>)
```

<word> = keyboard entry (e.g., <circuit identifier>)

<WORD> = keyboard entry with the exact letters to type (e.g., <CPSS>)

For keyboard entries, the options or limitations are included in the footnotes if possible. If a range of numbers is involved, the format is: range with units, increment, default. For example, 1-30 failures per hour,  $\Delta 1$ ,  $30^*$ .

 $\rightarrow$ CO A1 = the chapter where you can get more information about the softkey. The first two letters represent the manual, where CO is the Configuration manual and MA is the Maintenance manual. The letter (for the Configuration manual only) and number indicates the relevant chapter. If the softkey is described in more than one chapter, as they often are, the principal chapter is listed.

## O1. Main Menu

CONFIG	→Q1 - Q7
HOUSE	→Q10
MAINT	→Q8
ALARMS	→Q9
CANCEL	→CO A1
QUIT	→CO A1
PROCEED	→CO A1

TYPE

→CO C1

### Configuring the Module Positions Q2.

CONFIG	POSITION	<dsp></dsp>

	TONE_GEN		
CONFIG POSITION	<pp<sup>1&gt;</pp<sup>		
TYPE	VOICE	E+M LGE LGS MRD	→CO C1 →CO C1 →CO C1 →CO C1
	DATA	X21_DCM V35_DCM RS232_DCM OCU DNIC 4W-TO	→CO C1 →CO C1 →CO C1 →CO C1 →CO C1
	EMPTY AS_PRESENT		→CO C1 →CO C1
<escape> <escape></escape></escape>	CONFIG_ALL SHOW_ALL		→CO C1 →CO C1

<escape></escape>	SHOW_ALL	→CO C1
NAME	<name<sup>2&gt;</name<sup>	→CO C1
OPTIONS (for E&M)	0157-01	÷C0.C1

OF HONS (IOI EXIVI)	0157-01* 0157-03* 2_WIRE*/4_WIRE	→CO E3
OPTIONS (for LGE)	0526-01* 0526-03	→CO C1

	5525 55	
OPTIONS (for LGS)	0156-02 0156-03	→CO C1

0156-06*
0156-07
0156-08

OPTIONS (for OCU)	0693-01	→CO C1
	0693-02*	

 $<sup>^{1}</sup>pp$  = 1 to 12  $^{2}0$  - 8 alphanumeric characters

CONFIG	POSITION <t1></t1>				
NAME	<name<sup>1&gt;</name<sup>				→CO D1
OPTIONS	D4_FRAMING*/ESF				→CO D1
	LINE_LNGTH	0_150FT* 151_450FT 451_655FT			→CO D1
	LBO <sup>2</sup>	0dB* 7dB 15dB			→CO D1
	ZERO_SUPPR	TRANSP B8ZS JB7*			→CO D1
	FDL_CPSS/ FDL_UNUSED <sup>3</sup>				→CO 11
	MORE	TRUNK_COND	ONE_WAY/TWO_WAY* RED_ON*/RED_OFF YELLOW_ON*/YELLOW_OFF FAILED_ON*/FAILED_OFF ERROR_ON*/ERROR_OFF CSU_LP_ON*/CSU_LP_OFF		→CO D3 →CO D3
		ALARM_TIME	DECLARE CLEAR YELLOW_CLR	<time<sup>4&gt; <time<sup>5&gt; ON_SYNCH/ ON_RED_CLR*</time<sup></time<sup>	→CO D3 →CO D3 →CO D4

#### Module Configuration Display Menu Q3.

→CO C1 CONFIG SHOW\_ALL

<sup>&</sup>lt;sup>1</sup>0 - 8 alphanumeric characters
<sup>2</sup>The LINE\_LNGTH softkey is relabelled LBO for the CSU module configuration
<sup>3</sup>FDL\_CPSS/FDL\_UNUSED appears when ESF is selected
<sup>4</sup>1-300 tenths of a second, Δ1, 27\*

 $<sup>^{5}</sup>$ 1- 300 tenths of second,  $\Delta$ 1, 150\*

#### **Cross-connecting Circuits** Q4.

## CONFIG CONNECT

$ or $	SHOW_GROUP/SHOW_CCT		→CO C3
	DISCONNECT <sup>3</sup> TO_CIRCUIT	<t1-cc> or <pp-c> or <cpss<sup>4&gt;</cpss<sup></pp-c></t1-cc>	→CO C3 →CO C3
<escape> <escape></escape></escape>	ALL DISCON_ALL		→CO C3 →CO C3

#### Q5. **Configuring of System Timing**

## CONFIG SYNCH

SELECT/DESELECT		→CO H1
ENABLE/DISABLE		→CO H1
RECOVERY	AUTO* 30_SEC 1_MIN 10_MIN 30_MIN MANUAL	→CO H1
THRESHOLD	UNLIMITED* <number<sup>5&gt;</number<sup>	→CO H1

 $<sup>^1</sup>cc$  = 1 to 24  $^2pp$ -c = 1-1 , 1.2 . . . 12-1, 12-2 or 1-1 to 12-1 or 1-A, 1-B . . . 12-A, 12-B  $^3$ The DISCONNECT softkey appears only if the circuit is connected

<sup>&</sup>lt;sup>4</sup>CPSS is cross-connected to a T1 circuit only

<sup>&</sup>lt;sup>5</sup>0 to 30 failures per hour

#### **Configuring Voice and T1 Circuits** Q6.

CONFIG CIRCUIT <	pp-c <sup>1</sup> >				
SHOW_GROUP/SHOW_CCT					→CO C3
NAME	<name<sup>2&gt;</name<sup>				→CO C2
COPY_TO	<pp-c> <escape></escape></pp-c>	ALL			→CO C2 →CO C2
LEVELS (For E&M 4-Wire)	TX_TLP RX_TLP STANDARD*/EXTENDED	<tlp value=""> <tlp value=""></tlp></tlp>			→CO E1 to CO E4,F5 →CO E3
FUNCTION	(If circuit is LGS)	LS_EM LS GS GS_EM PLAR* PLAR_FXO MORE	DPO <sup>3</sup> GS_DNIS LS_DNIS WINKTIME DIGITTIME	<time<sup>4&gt; <time></time></time<sup>	→CO E1
	(If circuit is LGE)	LS GS* DPT	DIGITTIME	<ur><li>(µ11e&gt;</li></ur>	→CO E2
FAULT_SIG	SEIZED IDLE*				→CO E1 to CO E4
MORE	ENAB_DIAG/DISAB_DIAG*				<b>→MA</b> 3
CONFIG CIRCUIT <	T1- <i>cc</i> <sup>5</sup> >				
SHOW_GROUP/SHOW_CCT					<b>→</b> СО С3
NAME	<name<sup>6&gt;</name<sup>				→CO C2
COPY_TO	<t1-cc> <escape></escape></t1-cc>	ALL			→CO C2 →CO C2
FUNCTION	RBS_ON*/RBS_OFF VOICE*/DATA				→CO D2 →CO D2
FAULT_SIG	SEIZED IDLE* NONE				→CO D2
MORE	ENAB_DIAG/DISAB_DIAG* SIG_TYPE	SIG* NoSIG			→MA 3 →CO D2

 $<sup>^{1}</sup>pp\text{-}c$  = 1-1, 1-2 to 12-1 12-2  $^{2}$ 1-8 alphanumerics

<sup>&</sup>lt;sup>3</sup>This softkey only appears if the LGS circuit is on a module with line reversal capability

 $<sup>^4</sup>$ WINKTIME 50-400 ms, Δ50, 250\*; DIGITTIME 750 ms to 4.25 sec, Δ50, 750\*

 $<sup>^{5}\</sup>text{T1-}cc$  = T1-1 to T1-24, T1-FDL

<sup>61-8</sup> alphanumerics

#### **Configuring Data Circuits** Q7.

## CONFIG CIRCUIT <pp-c1>

•••••••••••••••••••••••••••••••••••••••					
SHOW_GROUP/ SHOW_CCT					-+CO СЗ
NAME	<name<sup>2&gt;</name<sup>				→CO C2
COPY_TO COPY_ADJ	<pp-c></pp-c>				→CO C2 →CO C2
FUNCTION .	I/F_MODE	SYNC/ASYNC* DTE/DCE* HALF_DPLX/FULL_DPLX*3 MULTIDROP	DISABLE* MASTER SLAVE <ime></ime>		→CO F1 to CO F3 CO F1, F3 →CO F1 to CO F3
		RTS/CTS <sup>4</sup>	<uri>unie&gt;</uri>		00111013
	RATE_ADAPT	METHOD  TRANSP_BW TRANSP_POS SIG_ON*/SIG_OFF I/F_SPEED DATA_POSN	HCM* TRANSPAREN DDS <√1.5> Br≥6 <speed<sup>7&gt; <ffbr8></ffbr8></speed<sup>		→CO G2 →CO G1 →CO G3 →CO G1, G2 →CO G1, G2 →CO G2 →CO G2, G3 →CO G2
	CTRL_LEADS <sup>9</sup>	INPUTS (If DCE)	DTR RTS ALB RDL C	ON OFF END_TO_END	→CO F1 to CO F3
		OUTPUTS (If DCE)	DSR CTS DCD Ri	ON OFF END_TO_END	→CO F1 to CO F3
	CLOCKING (Sync only)	INTERNAL SLAVE* EXTERNAL INDEPNT/LOCKED*			→CO F1 to CO F3
	CHAR_LEN (Async only)	5_BiTS 6_BiTS 7_BiTS 8_BiTS*			→CO F1 to CO F3
	STOP_BITS (Async only)	1_BIT* 2_BITS			→CO F1 to CO F3

 $<sup>^{1}</sup>pp\text{-}c$  = 1-1, 1-2, to 12-1 12-2 or 1-A, 1-B to 12-A, 12-B  $^{2}$ 1-8 alphanumerics

<sup>&</sup>lt;sup>3</sup>These softkeys do not appear for all data modules.

<sup>&</sup>lt;sup>4</sup>These softkeys do not appear for all data modules or only appear if the circuit is set for half-duplex or mutil-drop data bridge.

<sup>&</sup>lt;sup>5</sup>n = 1 to 8, 8\*

 $<sup>^{6}</sup>$ Bn = B7 to B0, B7\*

<sup>&</sup>lt;sup>7</sup>the speed, in b/s, depends upon the rate adaption method selected.

 $<sup>^{8}</sup>$ Ff = F0 to F9 and Bn = B7 to B0

<sup>&</sup>lt;sup>9</sup>The type of control leads available depends upon the data module and its device gender.

	PARITY (Async only)	NONE* ODD EVEN MARK SPACE	→CO F to CO f	
(for OCU)	I/F_SPEED	2400 4800 9600° 56000	→CO F	<del>-</del> 4
(for OCU)	SW56_ON/ SW56_OFF*		→CO F	<del>-</del> 4
FAULT_SIG (for OCU)	SEIZED IDLE*		→CO F	<del>-</del> 4

#### Q8. Maintenance Menu

MAINT					
DISPLAY	ALRM_COUNT* LAST_ALARM BKGND_TEST				→MA 1
DIAG	SHOW_CUR SHOW_LIST				→МА З
	ENABLE/DISABLE* RESTART <sup>1</sup>				→MA 3 →MA 3
	DIRECTED	<test number=""><sup>2</sup></test>	<circuit identifier<sup="">3&gt;</circuit>	X1 X10 X100 LOCK	→MA 3
		<escape> <escape></escape></escape>	SHOW_CUR SHOW_LIST	LOOK	→MA 3
	FAULT_LIST	HALT <sup>4</sup> <t1> or <pp>-</pp></t1>			→MA 3 →MA 3
(INDO 1449)#5					_
UNDO_MAINT <sup>5</sup>					→MA 4
ON_CIRCUIT	<t1-<i>co&lt; <i>or</i> &lt;<i>pp-c</i>⊳<sup>6</sup> (for T1 circuits)</t1-<i>	SHOW_SIGNL SET_SIGNAL LOOPBACK_A/UNDO_LPK	<signal<sup>7&gt; <signal></signal></signal<sup>		→MA 3 →MA 4
		LOOPBACK_C BUSY_OUT/UNBUSY*			→MA 3
	(for voice circuits)	SHOW_SIGNL <sup>8</sup> SET_SIGNAL LOOPBACK_A/UNDO_LPK LOOPBACK_B LOOPBACK_C BUSY_OUT/UNBUSY	<signal></signal>		→МА З
			<signal></signal>		→MA 4
					→MA 3
	(for OCU circuits)	SHOW_SIGNAL SET_SIGNAL OCU_LPBK/UNDO_LPK LOOPBACK_C BUSY_OUT*/UNBUSY	<signal> <signal></signal></signal>		→МА З
					→MA 4
					→МА З
	(for DCM circuits)	LOOPBACK_B/UNDO_LPK LOOPBACK_C BUSY_OUT/UNBUSY*			→MA 4
	(for DNIC circuits)	SHOW_SIGNAL SET_SIGNAL LOOPBACK_A/UNDO_LPK LOOPBACK_B LOOPBACK_C	<signal> <signal></signal></signal>		→МА З
			•		→MA 4
		BUSY_OUT/UNBUSY*			•MA 3

<sup>&</sup>lt;sup>1</sup>RESTART is not available if background diagnostics is disabled.

 $<sup>^3\</sup>mbox{For}\mbox{ T1}$  and voice circuits only when diagnostic test number 4 is selected

<sup>&</sup>lt;sup>4</sup>Appears after X1, X10, X100, or LOCK is selected

 $<sup>^{5}</sup>$ UNDO\_MAINT appears after a loopback has been selected.  $^{6}$ T1-cc = T1-1 to T1-24; pp-c = 1-1, 1-2 to 12-1 to 12-2, or 1-1 to 12-1 or 1-A, 1-B to 12-A to 12-B

<sup>&</sup>lt;sup>8</sup>The SHOW\_SIGNAL and SET\_SIGNAL softkeys do not appear for the 4W TO circuits

ON_MODULE	<t1></t1>	LOOPBACK/UNDO_LPK	EQUIPMENT LINE		→MA 4
	<ctl> <pp></pp></ctl>				•MA 3 •MA 3
MORE	BACKUP RESTORE VERIFY VIEW_NET	SHOW_NODES HOPS_AWAY VIA PATH	<node number=""> <number hops="" of=""> <node number=""> <pp-c> <node number=""></node></pp-c></node></number></node>		→MA 5 →MA 5 →MA 5 →MA 6
	NVM_DATA	<u>.,, _</u> ., , , , , ,	.,		→MA 5

#### Alarms Menu Q9.

ALARMS	MAJOR	ACK_ALL EARLIER <sup>1</sup> DELETE_ALL DELETE ACK LATER <sup>3</sup>	<alarm number<sup="">2&gt; <alarm number=""></alarm></alarm>	→MA 2
	MINOR	ACK_ALL EARLIER DELETE_ALL DELETE ACK LATER	<alarm number=""> <alarm number=""></alarm></alarm>	→MA 2
	DIAGNOSTIC	ACK_ALL EARLIER DELETE_ALL DELETE ACK LATER	<alarm number=""> <alarm number=""></alarm></alarm>	→MA 2
	CONFIG	<code #=""></code>	MAJOR MINOR DIAGNOSTIC	+MA 2
	EXTNL_ALRM	ENABLE/DISABLE* OPEN_CCT/CLOSED_CCT*		•MA 2
	MORE	LOGGING	RMT_ON/RMT_OFF* MDM_ON/MDM_OFF* LCL_ON/LCL_OFF*	<b>→MA</b> 2

 $<sup>^1{\</sup>rm The}$  EARLIER softkey appears if earlier alarms are not displayed  $^2{\rm As}$  listed under '#' in the queue  $^3{\rm The}$  LATER softkey appears if earlier alarms are not displayed

#### Q10. House Menu

## HOUSE

HOUSE					
SER_PORT_1	BAUD_RATE	300 600 1200 2400 4800			→CO B1
	PORT_TYPE	9600* VT100* CPSS PRINTER CPSS_MODEM			→CO B1
	LEVEL_0/NO_LEVEL_0*	CPSS_LONG			→со вз
	FLOW_CTRL	NONE* XON/XOFF			→CO B1
SER_PORT_2	BAUD_RATE	300 600 1200* 2400 4800 9600			→COB1
	PORT_TYPE	VT100 CPSS PRINTER CPSS_MODEM* CPSS_LONG			→CO B1
	LEVEL_0/NO_LEVEL_0* FLOW_CTRL	NONE* XON/XOFF DTR <sup>1</sup>			→CO B3 →CO B1
DATE	<dd-mmm-yy></dd-mmm-yy>				→CO B2
TIME	<hh:mma> or <hh:mmp></hh:mmp></hh:mma>				→CO B2
NODE_NAME	<name<sup>2&gt;</name<sup>				→CO B2
MORE	SESSN_TIME	5_MIN 10_MIN 15_MIN 30_MIN* NONE			→CO A1
	CHNG_PSSWD <sup>3</sup>	<password<sup>4&gt;</password<sup>	LEVEL_1 LEVEL_2 LEVEL_3 LEVEL_4 LEVEL_5	<new password=""> <new password=""> <new password=""> <new password=""> <new password=""></new></new></new></new></new>	→СО ВЗ
	NODE_NUM	<number<sup>6&gt;</number<sup>	V0	view passwords	→CQ I1
	NOC_NUM	<phone number<sup="">7&gt;</phone>			→CO 11

<sup>&</sup>lt;sup>1</sup>Appears only for serial port 2
<sup>2</sup>0 to 12 alphanumeric characters
<sup>3</sup>Appears only if logged on as level 5 user
<sup>4</sup>level 5 password
<sup>5</sup>8-12 alphanumeric characters, entered twice for verification

<sup>&</sup>lt;sup>6</sup>1-999, no number assigned\*

<sup>&</sup>lt;sup>7</sup>a telepone number, no number assigned\*

# Q11. Access Level Settings (Level 5 Users Only)

<escape> <a></a></escape>	LEVEL_1	READ/WRITE* READ_ONLY NO_ACCESS	→CO B3
	LEVEL_2	READ/WRITE* READ_ONLY NO_ACCESS	
	LEVEL_3	READ/WRITE* READ_ONLY NO_ACCESS	
	LEVEL_4	READ/WRITE* READ_ONLY NO_ACCESS	

*

## 2. Loopback Summary

This chapter summarizes loopbacks by:

providing the illustrations of all loopbacks supported by the 3624

Loopbacks are described in Chapter 4, Loopbacks in the Maintenance manual. This chapter is intended for those who are familiar with loopbacks, their initiation and removal. Loopback LEDs on the Control card are lit when there is a loopback on any circuit or the T1 line.

## 2.1 Voice Interface Module Loopbacks (E&M, LGS, LGE, and MRD)

#### Loopback A

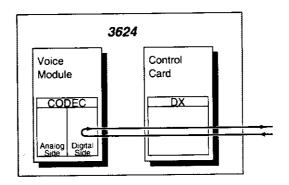


Figure 2-1: Loopback A, Voice Interface Modules

#### Loopback B

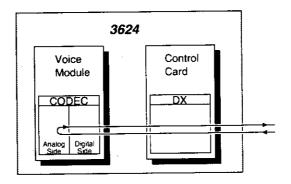


Figure 2-2: Loopback B, Voice Interface Modules

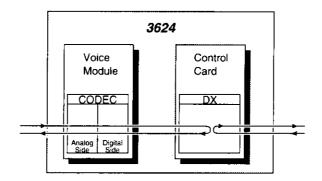


Figure 2-3: Loopback C, Voice Interface Modules

#### 2.2 Loopbacks for 2601, 2602 and 2603 DTUs

#### Loopback A

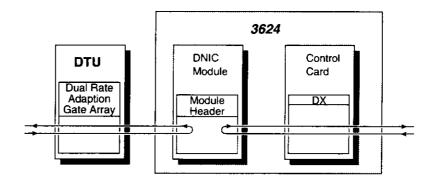


Figure 2-4: Loopback A, 2601, 2602 and 2603 DTUs

#### Loopback B

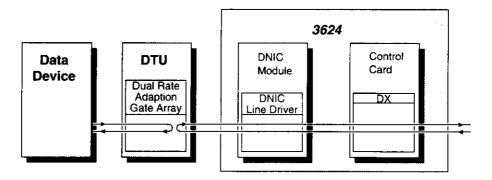


Figure 2-5: Loopback B, 2601, 2602 and 2603 DTUs

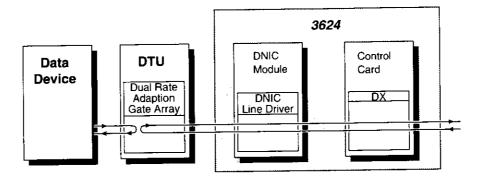


Figure 2-6: Loopback C, 2601, 2602 and 2603 DTUs

## 2.3 Loopbacks for the 2606 DTU

#### Loopback A 3624 Control DNIC 2606 Card/ Card/ DTU Module Module Dual Rate Adaption DΧ DNIC Data Gate Array Line Driver **Devices** 1 to 8

Figure 2-7: Loopback A, 2606 DTU

## Loopback B

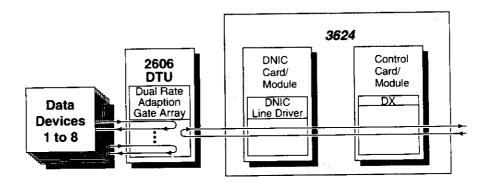


Figure 2-8: Loopback B, 2606 DTU

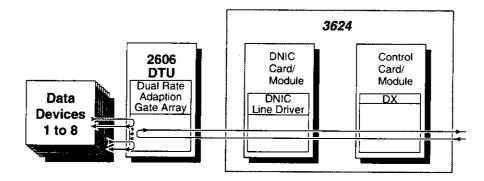


Figure 2-9: Loopback C, 2606 DTU

#### 2.4 Loopbacks for the 2608 and 2610 DTUs

# Loopback A on port A

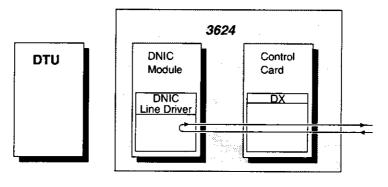


Figure 2-10: Loopback A, 2608 and 2610 DTUs

# Loopback B on port A

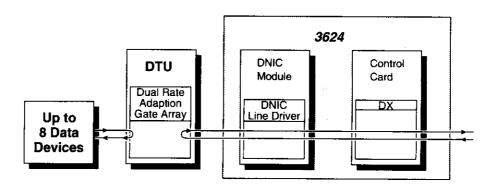


Figure 2-11: Loopback B, 2608 and 2610 DTUs

#### Loopback B and C on port B

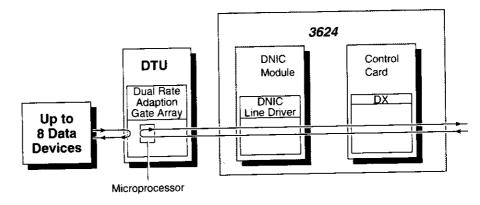


Figure 2-12: Loopback B and C, 2608 and 2610 DTUs

# Loopback C on port A

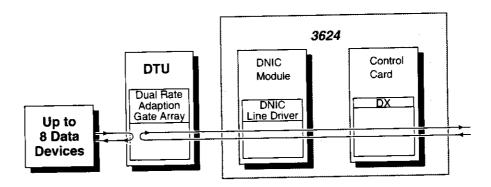


Figure 2-13: Loopback C, 2608 and 2610 DTUs

## 2.5 OCU Module Loopbacks

# OCU module loopback

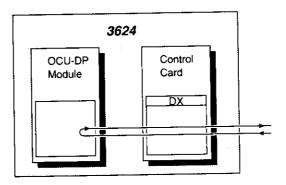


Figure 2-14: OCU Module Loopback

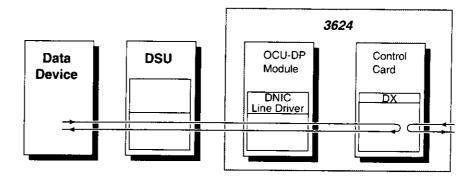


Figure 2-15: Loopback C, OCU Module

#### 2.6 DCM Loopbacks

#### Loopback B

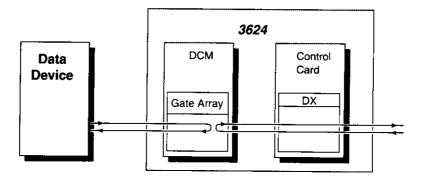


Figure 2-16: Loopback B, RS-232, X.21 and V.35 DCMs

#### Loopback C

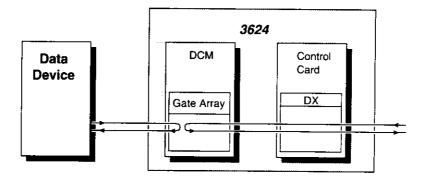


Figure 2-17: Loopback C, RS-232, X.21 and V.35 DCMs

#### 2.7 T1 Circuit Loopbacks

#### Loopback A

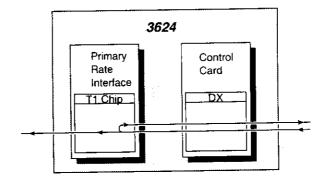


Figure 2-18: Loopback A, T1 Circuit

#### Loopback C

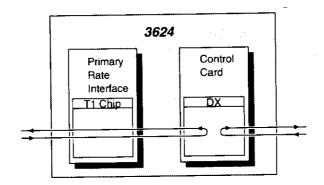


Figure 2-19: Loopback C, T1 Circuit

## 2.8 T1 Link Loopbacks

#### Equipment Loopback

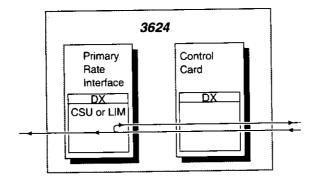


Figure 2-20: T1 Equipment Loopback

#### Line Loopback

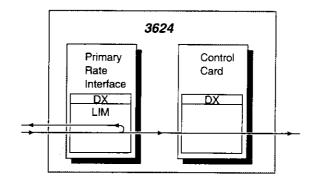


Figure 2-21: T1 Line Loopback

## 2.9 Network Loopbacks

#### CSU loopback

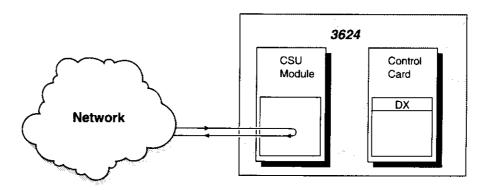


Figure 2-22: CSU Loopback, Network-directed

#### 2.10 DDS Loopbacks

If you subscribe to AT&T's Dataphone Digital Service (DDS), the DDS network may occasionally perform loopbacks on a per channel basis to assist in fault isolation. The loopbacks are:

- ☐ CSU (Channel Service Unit) loopback
- ☐ DSU (Data Service Unit) loopbacks
- OCU (Office Channel Unit) loopbacks

#### OCU loopback

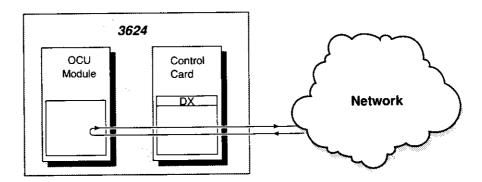


Figure 2-23: OCU Loopback, Network-directed

# 3. Command Summary

То	Enter	Chapter Reference
Acknowledge a specific alarm	ALARMS MAJOR or MINOR or DIAGNOSTIC ACK <alarm number=""> <return></return></alarm>	MA 2
Acknowledge all the alarms in a queue	ALARMS MAJOR or MINOR or DIAGNOSTIC ACK_ALL	MA 2
Assign the failure threshold	CONFIG SYNCH THRESHOLD < number > < Return > or UNLIMITED	CO H1
Assign the node number	HOUSE MORE NODE_NUM < number > < Return >	CO  1
Back up the database	MAINT MORE BACKUP	MA 5
Busy-out a circuit	MAINT ON_CIRCUIT <t1-cc> or <pp-c> <return> BUSY_OUT</return></pp-c></t1-cc>	MA 3
Change the password	HOUSE MORE CHNG_PSSWD <pre>cpassword&gt; <return> LEVEL_1 or LEVEL_2 or LEVEL_3 or LEVEL_4 or LEVEL_5 <new password=""> <return> <new password=""> <return></return></new></return></new></return></pre>	CO B3
Classify an alarm condition	ALARMS CONFIG < code #> < Return> MAJOR or MINOR or DIAGNOSTIC	MA 2
Configure the audio transmission for E&M modules	CONFIG POSITION <pp>&gt; <return> OPTIONS 2-WIRE or 4-WIRE</return></pp>	CO E3
Configure the control signals	CONFIG CIRCUIT <pp-c> <return> FUNCTION CTRL_LEADS INPUTS or OUTPUTS DSR or DCD or CTS or RI or DTR or RTS or ALB or RDL or C or I ON or OFF or END_TO_END</return></pp-c>	CO F1, F2, F3
Configure DDS rate adaption	CONFIG CIRCUIT <pp-c> <return> FUNCTION RATE_ADAPT METHOD DDS</return></pp-c>	CO G3
Configure external alarm as closed	ALARMS EXTN_ALRM CLOSED_CCT	MA 2
Configure external alarm as open	ALARMS EXTN_ALRM OPEN_CCT	MA 2
Configure fault classes	CONFIG POSITION <t1> <return> OPTION MORE TRUNK_COND RED_OFF or RED_ON OR YELLOW_OFF or YELLOW_ON OR FAILED_OFF or FAILED_ON OR ERROR_OFF or ERROR_ON OR CSU_LP_OFF or CSU_LP_ON</return></t1>	CO D3
Configure HCM rate adaption	CONFIG CIRCUIT $<\!pp\text{-}c\!>$ $<\!\text{Return}\!>$ FUNCTION RATE_ADAPT METHOD HCM	CO G2
Configure the interface speed (for OCU)	CONFIG CIRCUIT <pp-c> <return> FUNCTION I/F_SPEED 2400 or 4800 or 9600 or 56000</return></pp-c>	CO F4

То	Enter	Chapter Reference
Configure a master or slave device	CONFIG CIRCUIT <i><pp-c></pp-c></i> <return> FUNCTION I/F_MODE MULTIDROP MASTER or SLAVE</return>	CO F1, F2, F3
Configure the post-wink duration (LS_DNIS or GS_DNIS)	CONFIG CIRCUIT <pp-c> <return> MORE DIGITTIME <time> <return></return></time></return></pp-c>	CO E1
Configure the recovery method	CONFIG SYNCH RECOVERY AUTO or 30_SEC or 1_MIN or 10_MIN or 30_MIN or MANUAL	CO H1
Configure a resource module	CONFIG POSITION <dsp> <return> TYPE DDS or TONE_GEN</return></dsp>	CO C1
Configure the seven- segment display	MAINT DISPLAY ALRM_COUNT or LAST_ALARM or BKGND_TEST	MA 1
Configure transparent rate adaption	CONFIG CIRCUIT <pp-c> <retum> FUNCTION RATE_ADAPT METHOD TRANSPAREN</retum></pp-c>	CO G3
Configure the transmit clock	CONFIG CIRCUIT <pp-c> <return> FUNCTION CLOCKING INTERNAL or SLAVE or EXTERNAL LOCKED or INDEPNT</return></pp-c>	CO F1, F2, F3
Configure the wink duration (LS_DNIS or GS_DNIS)	CONFIG CIRCUIT <pp-c> <return> MORE WINKTIME <time> <return></return></time></return></pp-c>	CO E1
Connect a CPSS communication path to FDL	CONFIG POSITION <t1> <return> OPTIONS ESF FDL_CPSS</return></t1>	CO H1
Connect CPSS communication via modem	HOUSE SER_PORT_1 or SER_PORT_2 BAUD_RATE 300 or 600 or 1200 or 2400 or 4800 or 9600 PORT_TYPE CPSS_MODEM MORE NOC_NUM <pre>phone number&gt; <return></return></pre>	CO 11
Connect CPSS local communication path	HOUSE SER_PORT_1 or SER_PORT_2 BAUD_RATE 300 or 600 or 1200 or 2400 or 4800 or 9600 PORT_TYPE CPSS	CO 11
Connect CPSS to a T1 circuit	CONFIG CONNECT <t1-cc> <retum> TO_CIRCUIT <cpss> <return></return></cpss></retum></t1-cc>	CO 11
Copy and adjust the configuration	CONFIG CIRCUIT <pp-c> <return> COPY_ADJ <pp-c> <return></return></pp-c></return></pp-c>	CO C2
Copy circuit configuration to another like circuit	CONFIG CIRCUIT <t1-cc> or <pp-c> <return> COPY_TO <t1-cc> or <pp-c> <return></return></pp-c></t1-cc></return></pp-c></t1-cc>	CO C2
Copy circuit configuration to all like circuits	CONFIG CIRCUIT <t1-cc> or <pp-c> <return> COPY_TO <escape> ALL</escape></return></pp-c></t1-cc>	CO C2
Cross-connect all unconnected circuits at once	CONFIG CONNECT <escape> ALL</escape>	CO C3
Cross-connect circuits	CONFIG CONNECT <pp-c> <return> TO_CIRCUIT <t1-cc> <return></return></t1-cc></return></pp-c>	CO C3
Define access levels 1 to 4	<pre><escape> <a> LEVEL_1 or LEVEL_2 or LEVEL_3 or LEVEL_4 READ/WRITE or READ_ONLY or NO_ACCESS</a></escape></pre>	CO B3

То	Enter	
Delete a circuit name	CONFIG CIRCUIT < T1-cc> or <pp-c> <return> NAME <return></return></return></pp-c>	CO C2
Delete a module name	CONFIG POSITION <pp> <return> NAME <return></return></return></pp>	CO C1
Delete a node name	HOUSE NODE_NAME <retum></retum>	CO B2
Delete a specific alarm	ALARMS MAJOR or MINOR or DIAGNOSTIC DELETE <alarm number=""> <return></return></alarm>	MA 2
Delete all the alarms in a queue	ALARMS MAJOR or MINOR or DIAGNOSTIC DELETE_ALL	MA 2
Disable alarm logging locally	ALARMS MORE LOGGING LCL_OFF	MA 2
Disable alarm logging via CPSS	ALARMS MORE LOGGING RMT_OFF	MA 2
Disable alarm logging via a modem	ALARMS MORE LOGGING MDM_OFF	MA 2
Disable circuit background diagnostics	CONFIG CIRCUIT <t1-cc> <pp-c> <return> MORE DISAB_DIAG</return></pp-c></t1-cc>	MA 3
Disable external alarm	ALARMS EXTNL_ALRM DISABLE	MA 2
Disable robbed bit signalling	CONFIG CIRCUIT <t1-cc><return> FUNCTION RBS_OFF</return></t1-cc>	CO D2
Disable system background diagnostics	MAINT DIAG DISABLE	MA 3
Disable the T1 timing source	CONFIG SYNCH DISABLE	CO H1
Disconnect CPSS	CONFIG CONNECT <t1-cc> <return> DISCONNECT</return></t1-cc>	CO H1
Disconnect CPSS from FDL	CONFIG POSITION <t1> OPTIONS FDL_UNUSED</t1>	CO H1
Disconnect all connected circuits	CONFIG CONNECT < Escape > DISCON_ALL	CO C3
Disconnect one circuit	CONFIG CONNECT <t1-cc> or <pp-c> <return> DISCONNECT</return></pp-c></t1-cc>	CO C3
Display all nodes in the network	MAINT MORE VIEW_NET SHOW_NODES < node number> < Return>	MA 6
Display Control Card Information	MAINT ON_MODULE <ctl> <return></return></ctl>	MA 3
Display cross- connections of a group of circuits	CONFIG CIRCUIT <t1-cc> or <pp-c> <return> SHOW_GROUP</return></pp-c></t1-cc>	CO C3

То	Enter	Chapter Reference
Display cross- connection of one circuit	CONFIG CIRCUIT <t1-cc> or <pp-c> <return> SHOW_CCT</return></pp-c></t1-cc>	CO C3
Display module information	MAINT ON_MODULE <t1> or <pp> <return></return></pp></t1>	MA 3
Display module position(s)	CONFIG SHOW_ALL or CONFIG POSITION <escape> SHOW_ALL</escape>	CO C1
Display Nodes within a specific path	MAINT MORE VIEW_NET VIA_PATH <pp-c> <return> <node number=""> <return></return></node></return></pp-c>	MA 6
Display NVM information	MAINT MORE NVM_DATA	MA 5
Edit the signalling leads	MAINT ON_CIRCUIT <t1-cc> or <pp-c> <return> SET_SIGNAL &lt;0&gt; or &lt;1&gt; <return></return></return></pp-c></t1-cc>	MA 3
Enable alarm logging via CPSS	ALARMS MORE LOGGING RMT_ON	MA 2
Enable alarm logging via a modem	ALARMS MORE LOGGING MDM_ON	MA 2
Enable circuit background diagnostics	CONFIG CIRCUIT <t1-cc> <pp-c> <return> MORE ENAB_DIAG</return></pp-c></t1-cc>	MA 3
Enable external alarm	ALARMS EXTNL_ALRM ENABLE	MA 2
Enable local alarm logging	ALARMS MORE LOGGING LCL_ON	MA 2
Enable robbed bit signalling	CONFIG CIRCUIT <t1-cc> <return> FUNCTION RBS_ON</return></t1-cc>	CO D2
Enable system background diagnostics	MAINT DIAG ENABLE	MA 3
Enter the Network Operation Center (NOC) number	HOUSE MORE NOC_NUM <phone number=""> <retum></retum></phone>	CO H1
Initiate a 2601, 2602, 2603, 2606 2608 and 2610 DTU loopback	MAINT ON_CIRCUIT <pp-a> or <pp-b> <return> LOOPBACK_A or LOOPBACK_B or LOOPBACK_C</return></pp-b></pp-a>	MA 4
Initiate a DCM łoopback	MAINT ON_CIRCUIT <pp-c> <return> LOOPBACK_B or LOOPBACK_C</return></pp-c>	MA 4
Initiate an OCU Ioopback	MAINT ON_CIRCUIT <pp-c> <return> OCU_LPBK or LOOPBACK_C</return></pp-c>	MA 4
Initiate a T1 circuit loopback	MAINT ON_CIRCUIT <t1-cc> <return> LOOPBACK_A or LOOPBACK_C</return></t1-cc>	MA 4
Initiate a T1 link loopback	MAINT ON_MODULE <t1> <return> LOOPBACK EQUIPMENT or LINE</return></t1>	MA 4

То	Enter	Chapter Reference
Initiate a voice module circuit loopback	MAINT ON_CIRCUIT <pp-c> <return> LOOPBACK_A or LOOPBACK_B or LOOPBACK_C</return></pp-c>	MA 4
Name a circuit	CONFIG CIRCUIT < T1-cc> or <pp-c> <return> NAME &lt; name&gt; <return></return></return></pp-c>	CO C2
Name a module	CONFIG POSITION <pp <return=""> NAME <name> <return></return></name></pp>	CO C1
Name the node	HOUSE NODE_NAME < name> < Return>	CO B2
Name the primary rate link	CONFIG POSITION <t1> <return> NAME <name> <return></return></name></return></t1>	CO D1
Refresh the screen display	<escape> <r></r></escape>	CO A1
Remove a circuit from busy-out	MAINT ON_CIRCUIT <t1-cc> or <pp-c> <return> UNBUSY</return></pp-c></t1-cc>	MA 3
Remove all circuit loopbacks	MAINT UNDO_MAINT	MA 4
Remove an individual module circuit loopback	MAINT ON_CIRCUIT <t1-cc> or <pp-c> <return> UNDO_LPK</return></pp-c></t1-cc>	MA 4
Remove a master or slave device	CONFIG CIRCUIT <pp-c> <return> FUNCTION I/F_MODE MULTIDROP DISABLE</return></pp-c>	CO F1, F2, F3
Remove a T1 link loopback	MAINT ON_MODULE <t1> <return> UNDO_LPK</return></t1>	MA 4
Reset the NVM	MAINT MORE RESTORE PROCEED CANCEL	MA 5
Restart background diagnostics	MAINT DIAG RESTART	MA 3
Restore the configuration database	MAINT MORE RESTORE	MA 5
Run directed diagnostics	MAINT DIAG DIRECTED < test number> < Return> ( <t1-cc> or <pp-c> <return> for test #4 only) X1 or X10 or X100 or LOCK</return></pp-c></t1-cc>	MA 3
Select the clearing of the Yellow alarm	CONFIG POSITION <t1> <return> OPTIONS MORE ALARM_TIME YELLOW_CLR ON_RESYNCH or ON_RED_CLR</return></t1>	CO D4
Select data inversion	CONFIG CIRCUIT <t1-cc> <return> FUNCTION VOICE or DATA</return></t1-cc>	CO D2
Select the device type	HOUSE SER_PORT_1 or SER_PORT_2 VT100 or PRINTER or CPSS or CPSS_MODEM or CPSS_LONG	CO B1
Select the internal timing source	CONFIG SYNCH DESELECT	CO H1
Select the serial port	HOUSE SER_PORT_1 or SER_PORT_2	CO B1

То	Enter	
Select the T1 Timing Source	CONFIG SYNCH ENABLE or SELECT	CO H1
Set the alarm clearing time	CONFIG POSITION <t1> <return> OPTIONS MORE ALARM_TIME CLEAR <ti>clear <ti>cl</ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></ti></return></t1>	CO D3
Set the alarm declaration time	CONFIG POSITION <t1> <return> OPTIONS MORE ALARM_TIME DECLARE <time> <return></return></time></return></t1>	CO D3
Set the automatic log off	HOUSE MORE SESSN_TIME 5_MIN or 10_MIN or 15_MIN or 30_MIN or NONE	CO A1
Set the baud rate	HOUSE SER_PORT_1 or SER_PORT_2 BAUD_RATE 300 or 600 or 1200 or 2400 or 4800 or 9600	CO B1
Set the character length	CONFIG CIRCUIT <pp-c> <return> FUNCTION CHAR_LEN 5_BITS or 6_BITS or 7_BITS or 8_BITS</return></pp-c>	CO F1, F2, F3
Set the data device gender	CONFIG CIRCUIT <pp-c> <retum> FUNCTION I/F_MODE DTE or DCE</retum></pp-c>	CO F1, F2, F3
Set the data device mode	CONFIG CIRCUIT $$ <return> FUNCTION I/F_MODE ASYNC or SYNC</return>	CO F1, F2,F3
Set the data position (for HCM rate adaption)	CONFIG CIRCUIT <pp-c> <return> FUNCTION RATE_ADAPT DATA_POSN <ff-bn> <return></return></ff-bn></return></pp-c>	CO G2
Set the data super- rate for X.21 and V.35 DCMs	CONFIG CIRCUIT <pp-c> Return&gt; FUNCTION RATE_ADAPT I/F_SPEED <number> <return></return></number></pp-c>	CO F3
Set the date	HOUSE DATE <dd-mmm-yy> <return></return></dd-mmm-yy>	CO B2
Set the duplex method	CONFIG CIRCUIT <pp-c> <return> FUNCTION I/F_MODE HALF_DPLX or FULL_DPLX</return></pp-c>	CO F1, F3
Set the extended RX TLP (for E&M)	CONFIG CIRCUIT <pp-c> <return> LEVELS EXTENDED RX_TLP <tlp value=""> <return></return></tlp></return></pp-c>	CO E3
Set the extended TX TLP (for E&M)	CONFIG CIRCUIT <pp-c> <return> LEVELS EXTENDED TX_TLP <tlp value=""> <return></return></tlp></return></pp-c>	CO E3
Set the flow control	HOUSE SER_PORT_1 or SER_PORT_2 FLOW_CTRL NONE or XON/XOFF or DTR	CO B1
Set the framing format	CONFIG POSITION <t1> <return> OPTIONS D4_FRAMING or ESF</return></t1>	CO D1
Set the interface speed (for HCM and DDS rate adaption)	CONFIG CIRCUIT <pp-c> <return> FUNCTION RATE_ADAPT  /F_SPEED <speed> <return></return></speed></return></pp-c>	CO G2, G3
Set level 0 access	HOUSE SER_PORT_1 or SER_PORT_2 LEVEL_0 or NO_LEVEL_0	CO B3
Set the line build-out	CONFIG POSITION <t1> <return> OPTIONS LBO 0dB or 7dB or 15dB</return></t1>	CO D1
Set the line length	CONFIG POSITION <t1> <return> OPTIONS LINE_LNGTH 0_151FT or 151_450FT or 451_655FT</return></t1>	CO D1

То	Enter	Chapter Reference
Set the module fault signalling	CONFIG CIRCUIT <pp-c> <retum> FAULT_SIG SEIZED or IDLE</retum></pp-c>	CO E1, E2, E3, E4, F4
Set the number of stop bits	CONFIG CIRCUIT <pp-c> <retum> FUNCTION STOP_BITS 1_BITS or 2_BITS</retum></pp-c>	CO F1, F2, F3
Set the parity	CONFIG CIRCUIT <pp-c> <return> FUNCTION PARITY NONE or ODD or EVEN or MARK or SPACE</return></pp-c>	CO F1, F2, F3
Set the RTS/CTS delay	CONFIG CIRCUIT <pp-c> <return> FUNCTION I/F_MODE RTS/CTS <time> <return></return></time></return></pp-c>	CO F1, F2, F3
Set the RX TLP	CONFIG CIRCUIT <pp-c> <return> LEVELS RX_TLP <tlp value=""> <return></return></tlp></return></pp-c>	CO E1, E2, E3, E4, F5
Set the signalling type (for HCM rate adaption)	CONFIG CIRCUIT <pp-c> <return> FUNCTION RATE_ADAPT SIG_ON or SIG_OF?</return></pp-c>	CO G2
Set the signalling type for LGE	CONFIG CIRCUIT <pp-c> <return> FUNCTION LGE LS or GS or DPT</return></pp-c>	CO E2
Set the signalling type for LGS	CONFIG CIRCUIT <pp-c> <return> FUNCTION LS or GS or LS_EM or GS_EM or PLAR or PLAR_FXO or MORE DPO or MORE LS_DNIS or MORE GS_DNIS</return></pp-c>	CO E1
Set switched 56 data service	CONFIG CIRCUIT <pp-c> <return> FUNCTION SW56_ON or SW56_OFF</return></pp-c>	CO F4
Set the T1 circuit signalling type	CONFIG CIRCUIT <t1-cc> MORE SIG_TYPE SIG or NoSIG</t1-cc>	CO D2
Set the T1 fault signalling	CONFIG CIRCUIT <t1-cc> <return> FAULT_SIG SEIZED or IDLE or NONE</return></t1-cc>	CO D2
Set the time	HOUSE TIME <hh:mma> or <hh:mmp> <return></return></hh:mmp></hh:mma>	CO B2
Set the transport bandwidth	CONFIG CIRCUIT <pp-c> <retum> FUNCTION RATE_ADAPT TRANSP_BW <n> <retum></retum></n></retum></pp-c>	CO G1, G2
Set the transport position	CONFIG CIRCUIT <pp-c> <return> FUNCTION RATE_ADAPT TRANSP_POS  r&gt; <return></return></return></pp-c>	CO G1, G2
Set the TX TLP	CONFIG CIRCUIT <pp-c> <return> LEVELS TX_TLP <tlp value=""> <return></return></tlp></return></pp-c>	CO E1, E2, E3, E4, F5
Set the type of trunk conditioning	CONFIG POSITION <t1> <return> OPTIONS MORE TRUNK_COND ONE_WAY or TWO_WAY</return></t1>	CO D3
Set zero code suppression	CONFIG POSITION <t1> <return> OPTIONS ZERO_SUPPR TRANSP or B8ZS or JB7</return></t1>	CO D1
Specify all module positions at once	CONFIG POSITION <escape> CONFIG_ALL</escape>	CO C1
Specify a DNIC module	CONFIG POSITION <pp>&gt; <return> TYPE DATA DNIC</return></pp>	CO C1
Specify a 4W TO module	CONFIG POSITION <pp>&gt; <return> TYPE DATA 4W TO</return></pp>	CO C1
Specify an E&M module	CONFIG POSITION <pp> <return> TYPE VOICE E&amp;M OPTIONS 0157-01 or 0157-03</return></pp>	CO C1

То	Enter	Chapter Reference
Specify a LGE module	CONFIG POSITION <pp> <return> TYPE VOICE LGE OPTIONS 0526-01 or 0526-03</return></pp>	CO C1
Specify a LGS module	CONFIG POSITION <pp> <return> TYPE VOICE LGS OPTIONS 0156-02 or 0156-03 or 0156-06 or 0156-07 or 0156-08</return></pp>	CO C1
Specify a module as present	CONFIG POSITION <pp> <return> TYPE AS_PRESENT</return></pp>	CO C1
Specify an MRD module	CONFIG POSITION <pp> <return> TYPE VOICE MRD</return></pp>	CO C1
Specify no module	CONFIG POSITION <pp> <return> TYPE EMPTY</return></pp>	CO C1
Specify an OCU module	CONFIG POSITION <pp> <return> TYPE DATA OCU OPTIONS 0693-01 or 0693-02</return></pp>	CO C1
Specify an RS-232 DCM module	CONFIG POSITION <pp> <return> TYPE DATA RS232_DCM</return></pp>	CO C1
Specify an V.35 DCM module	CONFIG POSITION <pp> <return> TYPE DATA V.35_DCM</return></pp>	CO C1
Specify an X.21 DCM module	CONFIG POSITION <pp> <return> TYPE DATA X.21_DCM</return></pp>	CO C1
Stop directed diagnostics	MAINT DIAG DIRECTED HALT	МАЗ
Verify the Database	MAINT MORE VERIFY	MA 5
View an alarm queue	ALARMS MAJOR or MINOR or DIAGNOSTIC	MA 2
View an alarm queue earlier entries	ALARMS MAJOR or MINOR or DIAGNOSTIC EARLIER	MA 2
View an alarm queue later entries	ALARMS MAJOR or MINOR or DIAGNOSTIC LATER	MA 2
View nodes a specified number of hops away	MAINT MORE VIEW_NET HOPS_AWAY < number of hops> < Return> < node number> < Return>	MA 6
View the diagnostic test fault list	MAINT DIAG FAULT_LIST <t1> or <pp> <return></return></pp></t1>	MA 3
View the diagnostic test in progress	MAINT DIAG SHOW_CUR	MA 3
View the diagnostic tests available	MAINT DIAG SHOW_LIST	MA 3
View the routing table	MAINT MORE VIEW_NET	MA 6
Viewing the signalling leads	MAINT ON_CIRCUIT <t1-cc> or <pp-c> <return> SHOW_SIGNL</return></pp-c></t1-cc>	MA 3
View the system timing	CONFIG SYNCH	CO H1



Newbridge has attempted to accurately describe the intended functionality and operational procedures of this product. However, Newbridge does not warrant that the product will meet your particular requirements or that the product will not be subject to modifications.

Selected functionality may not be available in this release. Please contact your Newbridge regional sales office for specific release dates.

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# 3624 MainStreet Intelligent T1 Channel Bank

Release 7 Generic 6107/6207

Node Configuration Forms





## **Foreword**

The documentation set of the 3624 MainStreet Intelligent T1 Channel Bank contains the following manuals:

<b>_</b>	Installation (Part number 95-B200-01-00-B)
<b>_</b>	Configuration (Part number 95-B400-01-00-B)
_	Maintenance (Part number 95-B500-01-00-B)
<u> </u>	Ouick Reference Guide (Part number 95-B450-01-00-B)
_ _	Node Configuration Forms (Part number 95-B460-01-00-B)
<u> </u>	Ordering Information (Part number 95-B050-01-00-B)
<u> </u>	Index (Part number 95-B005-01-00-B
<u> </u>	Content Summary (Part number 95-B000-01-00-B)

**Installation:** This manual provides the instructions required to install and set up the 3624.

**Configuration:** This manual provides the instructions required for all configuration operations for the *3624*.

**Maintenance**: This manual explains all maintenance functions and how to perform them.

**Quick Reference Guide:** This manual contains a summary of the configuration and maintenance commands sequences.

**Ordering Information:** This manual lists the available 3624 parts and accessories, and their order numbers.

**Index:** This manual contains the indexes for the Installation, Configuration and Maintenance manuals.

**Content Summary:** This manual provides a listing of the main content of the manuals in the documentation set.

#### Node Configuration Forms

This manual contains a series of forms to fill out for planning and recording the configuration settings.

Not all 3624 MainStreet systems include all of the components or features described in this manual. The components included and the features supported depend on the type of system and the generic software. This documentation set describes software generics 6107 and 6207, Release 7.

This documentation set describes the management of the 3624 node using the NMTI. A node management session can be initiated from the 4600 MainStreet family of network managers. If you are using a network manager, the menus and screens displayed by the network management software are the similar to those described in this documentation. Refer to the 4600 documentation for more detailed information.

#### **Symbols**

Several symbols, explained below, are used in the 3624 documentation to draw your attention to important information.



DANGER: Danger indicates that the described activity or situation may pose a threat to personal safety.



WARNING: A warning indicates that the described activity or situation may/will cause equipment damage.



CAUTION: A caution indicates that the described activity or situation may/will cause service interruption.



NOTE: Notes provide information that is or may be of special interest.

# **Table of Contents**

Forev	vord	;;;
	Node Configuration Forms	i v
	Symbols	I V
Table	e of Contents	
Node	Configuration Forms	1
	m 4 NT 1. ID	۱ ژ
	n o C (-1 Cd Modules Installed	4
	To the form Card and Modules Installed	
	T. A. Carial Dark Cattings	
	F F. T1 Module Options	
	TO Commit Online	
	T. J. CE Voice Module and Circuit Configuration	/
	n o r CC Vales Module and Circuit Configuration	
	r o. r.e.M. Voice Module and Circuit Configuration	
	E 10. MPD Voice Module and Circuit Configuration	1 3
	To an all AW TO Module and Circuit Configuration	14
	E 10 DC 222 DCM Configuration	1
	T 12. DNIC Data Modula Circuit Contiguitation	
	To 14 V 21 DCM Circuit Configuration	4
	E 1E. VI 2E DCM Circuit Continuation	
	T 16. OCH Module and Circuit Configuration	
	Tame 17. Accord Lovel Settings	
	T 10. Alarma Ougue Classifications	
	Form 19: System Timing	

		•	

# **Node Configuration Forms**

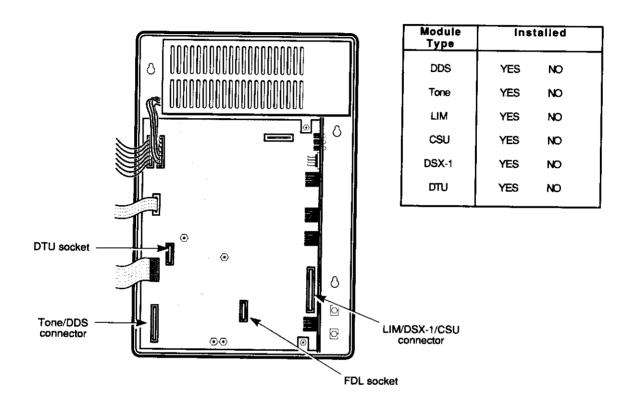
We recommend you fill out these forms to aid configuration of the 3624 MainStreet Intelligent T1 Channel Bank and to provide a permanent record of the configuration settings.

#### Form 1: Node Record

Node Name:
Node Number:
Location:
Date Commissioned:
Commissioned by:

#### Form 2: Control Card Modules Installed

Node ID \_\_\_\_



## Form 3: Interface Card and Modules Installed

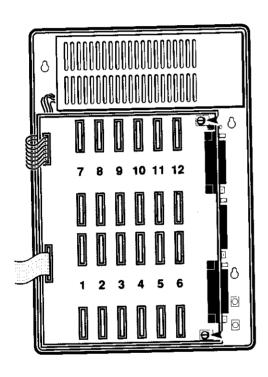
Node ID \_\_\_\_\_

Interface Card Module

Universal

Universal (48 V)

LGS (48 V)



Position Number	Type of Module Installed
Mt	
M2	
MB	
M4	
M5	
M6	
M7	
MB	
MĐ	
<b>M</b> 10	
M11	
M12	

## Form 4: Serial Port Settings

Node ID		_
Node Number (1 through 999)  Node Name  Location		
Session Time	NONE 5_MII	N 10_MIN 15_MIN 30_MIN
Serial Port 1 Baud Rate	300 600	1200 2400 4800 9600
Serial Port 1 Port Type	VT100 CPSS	PRINTER CPSS_MODEM CPSS_LONG
Serial Port 1 Level 0?	YES NO	
Flow Control	NONE	XON/XOFF
Serial Port 2 Baud Rate	300 600	1200 2400 4800 9600
Serial Port 2 Port Type	VT100 CPSS	PRINTER CPSS_MODEM CPSS_LONG
Serial Port 2 Level 0?	YES NO	
Flow Control	NONE	XON/XOFF DTR

XON/XOFF

DTR

Form 5: T1 Module Options

Node ID
---------

Node ID		<del></del>	
Module Installed	LIM	DSX-1	CSU
T1 Framing	ESF	D4_FRAMING	
Zero Suppression	TRANSP	B8ZS	JB7
Line Length/LBO	0_150 ft/0 dB	151_450 ft/7 dB	451_655 ft/15 dB
Trunk Conditioning	ONE_WAY RED_ON YELLOW_ON FAILED_ON ERROR_ON CSU_LP_OFF	TWO_WAY RED_OFF YELLOW_OFF FAILED_OFF ERROR_OFF CSU_LP_ON	
Alarm Time	DECLARE CLEAR YELLOW_CLR	ON_SYNCH/ON_RED_CLR	- T
FDL	FDL_CPSS	FDL_UNUSED	

## Form 6: T1 Circuit Options

Node ID\_\_\_\_\_

Circuit #	Name		nalling Type		ed Bit	Fault Signalling		Data Bit Inversion		Diagnostics		
T1-1		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZE	) IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
Ť1-2		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZE	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-3		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-4		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-5		SIG	NoSIG	RBS_ON	R8S_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-6		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
<b>T</b> 1-7		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-8		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-9		SIG	NoSIG	ABS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-10	<del>"</del>	SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-11		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-12		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-13		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-14		SIG	NoSIG	RBS_ON	R8S_OFF	SEIZED	HDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB DIAG
T1-15		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB DIAG
T1-16		SIG	NoSiG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB DIAG
T1-17		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB DIAG	ENAB DIAG
T1-18		SIG	NoSiG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB DIAG
T1-19		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB DIAG
T1-20		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB DIAG	ENAB DIAG
T1-21	<u> </u>	SIG	NoSiG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB DIAG
T1-22	<u>.</u>	SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB DIAG
T1-23		SIG	NoSIG	RBS_ON	RBS_OFF	SEIZED	IIDLE	NONE	VOICE	DATA	DISAB_DIAG	ENAB_DIAG
T1-24		SIG	NoSIG	RBS_ON	RBS OFF	SEIZED	IIDt F	NONE	VOICE	DATA	DISAB DIAG	ENAB DIAG

# Form 7: LGE Voice Module and Circuit Configuration

Position		Variant		sition Variant Circuit		Circuit	TLP Fault						Connect
#	Name			Name		( RX	Signalling			To			
*	, Admis	0526-01	1				Seized	ldle	LS	GS	DPT		
1		0526-03	2				Seized	idle	LS	GS	DPT		
		0526-01	1			_	Seized	Idie	LS	GS	DPT		
2		0526-03	2				Seized	ldle	LS	GS	DPT		
_		0526-01	1				Seized	idle	LS	GS	DPT		
3		0526-03	2				Seized	ldle	LS	GS	DPT		
		0526-01	1		<u> </u>		Seized	Idie	LS	GS	DPT		
4		0526-03	2		-	<del>  -</del>	Seized	ldie	LS	GS	DPT		
		0526-01	1			<del>                                     </del>	Seized	ldte	LS	GS	DPT		
5		0526-03	2			-	Seized	Idle	LS	GS	DPT		
		0526-01	1				Seized	Idle	LS	GS	DPT		
6		0526-03	2		<del>                                     </del>	<del> </del>	Seized	Idle	LS	GS	DPT		
	<u> </u>	0526-01	1			-	Seized	Idle	LS	GS	DPT		
7		0526-03	2		+		Seized	idie	LS	GS	DPT		
_	<del>                                     </del>	0526-01	1		<del>                                     </del>	<del>                                     </del>	Seized	idle	LS	GS	DPT		
8		0526-03	2		1	1	Seized	Idle	LS	GS	DPT		
	<del> </del>	0526-01	1			+	Seized	Idle	LS	GS	DPT		
9		0526-03	2		+	+	Seized	ldle	LS	GS	DPT		
1.0	+	0526-01	1		1		Seized	ldle	LS	GS	DPT		
10		0526-03	2	<u> </u>	+	+	Seized	idle	LS	GS	DPT		
	<del>                                     </del>	0526-01	1		<del>                                     </del>		Seized	idle	LS	GS	DPT		
11		0526-03	2		1-	<del>                                     </del>	Seized	Idle	LS	GS	DPT		
	<del> </del>	0526-01	1	<del> </del>		+	Seized	ldle	LS	GS	DPT		
12		0526-03	2	<del>                                     </del>		+	Seized	ldle	LS	GS	DPT		

Form 8: LGS Voice Module and Circuit Configuration

	Position	Variant	Variant Circuit TLP					Fault Signalling					
#	Name	Number	#	Name	TX	RX	Signaliin	а	ł	Connect To			
1		0156-02 0156-03 0156-06	1					die	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	10	
		0156-07 0156-08	2	:			Seized lo	dle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
2		0156-02 0156-03 0156-06	1				Seized k	dle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
		0156-07 0156-08	2				Seized lo	lie	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
3		0156-02 0156-03 0156-06	1				Seized la	lle .	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
		0156-07 0156-08	2				Seized Id	le	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
4		0156-02 0156-03 0156-06	1				Seized Id	le	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	-	
		0156-07 0156-08	2				Seized Idi	le	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
5		0156-02 0156-03 0156-06	1				Seized Idl	e	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
		0156-07 0156-08	2				Seized Idl	е	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
6		0156-02 0156-03 0156-06	1				Seized Idl	e	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		
	_	0156-07 0156-08	2				Seized Idio	е	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime		

# Form 8: LGS Voice Module and Circuit Configuration (continued)

	osition	Variant		Circuit	T	P	Faul	t 🗍	8	Signalling		Connect
# [	Name	Number	#	Name	ТX	RX	Signal	ing		Туре		To
	Manie	0156-02 0156-03 0156-06	1				Seized	ldle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
7		0156-07 0156-08	2				Seized	idle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
8		0156-02 0156-03 0156-06	1				Seized	ldle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
		0156-07 0156-08	2				Seized	idle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
9		0156-02 0156-03 0156-06	1				Seized	ldie	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
		0156-07 0156-08	2				Seized	ldle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
10		0156-02 0156-03 0156-06	1		-		Seized	kdie	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
		0156-07 0156-08	2				Seized	ldle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
11		0156-02 0156-03 0156-06	1				Seized	ldle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
, (		0156-07 0156-08	2				Seized	idle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
12		0156-02 0156-03 0156-06	1				Seized	ldie	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	
		0156-07 0156-08	2				Seized	Idle	LS GS PLAR PLAR_FXO DPO	LS_EM GS_EM LS_DNIS GS_DNIS	Winktime Digittime	

Form 9: E&M Voice Module and Circuit Configuration

	Position	Variant	Audio		Circuit	Т	LP		Fault	Connect
#	Name	Number	Transmission	#	Name	Type	TX	RX	Signalling	To
,		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
2		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized idle	
		0157-03	4-WitRE	2		STANDARD EXTENDED			Seized Idle	
3		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
4		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
5		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
6		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
7		0157-01	2-WIRE	1	-	STANDARD EXTENDED			Seized Idie	
		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
8		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
_		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized idle	
9		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
10		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
$\dashv$		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
11		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
$\dashv$		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	
12		0157-01	2-WIRE	1		STANDARD EXTENDED			Seized Idle	
		0157-03	4-WilRE	2		STANDARD EXTENDED			Seized Idle	

# Form 10: MRD Voice Module and Circuit Configuration

1 2	Position		Circuit	т	LP	Fau	lt l	Connect
#	Name	# [	Name	ТX	RX	Signal	ling	То
1		11				Seized	ldie	
1		2				Seized	ldle	
2		11				Seized	idie	
		2				Seized	ldie	
3		1				Seized	ldie	
1		2				Seized	Idle	
4		1 1				Seized	Idle	
		2				Seized	ldle	
5		1				Seized	ldle	
		2				Seized	Idle	
6		1				Seized	ldle	<u></u>
1		2				Seized	Idle	
7		1				Seized	Idle	<u></u> _
		2				Seized	ldle	
В		1				Seized	ldle	
		2				Seized	ldle	<u> </u>
9	<u> </u>	1				Seized	ldle	<u> </u>
		2		$\top$		Seized	idle	
10		1				Seized	idle	
		2	<b> </b>		1	Seized	idle	<u></u>
11		1	<del>                                     </del>			Seized	ldle	
		2	<del>                                     </del>			Seized	idle	
12		-   1		$\neg$	1	Seized	idle	<u> </u>
_	<u> </u>	2	<del>                                     </del>		1 -	Seized	idle	

Form 11: 4W TO Module and Circuit Configuration

	Position	T	Circuit	1	LP	Connect
#	Name	#	Name	TX	RX	То
1		1				
		2				
2		1				
<u></u>		2				
3		1				
		2				
4		1				
		2				
5		1				
<u> </u>		2				
6		1		igsquare		
		2				
7		1				
		2				
8		1		1		
		2	<del></del>			
9		1				
		2	·			
10		1				
	···	2				
11		1		$\sqcup \bot$		
		2	·-			<u></u>
12		1				
[		2				

# Form 12: RS-232 DCM Configuration

os. #	1		2		3		4		5		6	
os. Name											<del></del>	
Cct #	1	2	1	2	1	2	1	2		2		2
ct Name											}	
Device	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC		SYNC	]	SYNC
Mode	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC
Device	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE		DTE	DTE	DTE
Gender	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE
RTS/CTS Delay (ms)												
	5	5	5	5	5	5	5	5	5	5	5	5
Character	6	6	6	6	6	6	6	6	6	6	6	6
Length	7	7	7	7	7	7	7	7	7	7	7	7
(Bits)	8	8	В	8	8	8	8	8	8	8	8	8
Stop	1	1	1	1	1	1	1	1	1	1	1	1
Bits	2	2	2	2	2	2	2	2	2	2	2	2
	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD
Parity	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN
-	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK
	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE
	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT
i	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT
Clocking	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE
	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEF
	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK
	Master	Master	Master	Master	Master	Master	Maste	Master	Master	Master	<b>\</b>	1
Multi-drop	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Stave
	Disable	Disable	e Disable	Disable	Disable	Disable	Disabl	e Disable	Disable	Disable	Disable	Disab
Connect Te		+-			T				1	L_		<u> </u>

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Pos. Name	,		-				<del></del>		<u> </u>	11	╁	12
Cct #	1	1 2	1	2	1	2	<del> </del> -	Τ.	<del> </del>	<del></del>	ļ	<del></del>
Cct Name	+	+	<del>                                     </del>	<del>                                     </del>	+	<del>  -</del> -	1	2	1	2	1	2
Device	SYNC	SYNC	0,0,0	5,0,0		<del> </del>	┿	<del> </del>	ļ		<u> </u>	ļ
Mode	ASYNC		SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC
	+	_	<del> </del>	ASYNC	ASYNC	ASYNO	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC
Device	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE
Gender	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE
RTS/CTS Delay (ms)												
	5	5	5	5	5	5	5	5	5	5	5	5
Character	6	6	6	6	6	6	6	6	6	6	6	6
Length	7	7	7	7	7	7	7	7	7	7	7	7
(Bits)	8	8	8	8	8	8	8	8	В	8	8	8
Stop	1	1	1	1	1	1	1	1	1	1	1	1
Bits	2	2	2	2	2	2	2	2	2	2	2	2
	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD
Parity	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN
	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK I	MARK
	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE
	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT
	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT .	EXT	EXT	EXT
Clocking	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE
	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP
	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK
	Master	Master	Master	Master	Master	Master	Master	Master	Master	Master	Master	Master
Multi-drop	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave
	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable
Connect To	$\neg \neg$									-		
			L									

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08. #			<del></del> }												
os. Name				1 1		1	2	1	2	1	2	1	2	<u> </u>	2
ct # 															
Oct Name		DTE	DCD	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Sync Contol	Inputs	DCE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Leads		DTE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	Outputs	DCE	стѕ	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	<del> </del>	DTE	DCD	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		Die	DSR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	Inputs	DCE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OF
Async Control			DTR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OF E-E
Leads		DTE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	E-1
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	Output	DCE	стя	ON	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFI E-E		ON OFI E-E			ON OFF E-E	E-
			DTI	ON	ON OF		ON OFF E-E	ON OFI E-E		F OF		F OF			F ∖O

Pos. #					7	T	8	$T^{-}$	9	_	10	T	11	1	12
Pos. Nam	ie					1		7		1 -				1	
Cct #				1	2	1	2	1	2	1	2	1	2	1	2
Cct Nam	e									$\top$		1	<del>                                     </del>	<del>                                     </del>	1
	Inputs	DTE	DCD	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Sync Contoi Leads		DCE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-É
	Outputs	DTE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
·		DCE	стѕ	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DTE	DCD	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	Inputs		DSR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DCE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Async Control Leads			DTR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DTE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	Outputs		DTR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DCE	стѕ	ON OFF E-E	ON OFF E-E	ON OFF É-E	ON OFF E-E	ON OFF E-E	ON OFF E-E						
			DTR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF É-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E

Pos. #			1		2		3		4		5		6	
Pos. Name														
Cct #			1	2	1	2	1	2	_1	2	1	2	1	2
Cct Name													\	
		Transport Bandwidth	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	нсм	Transport Position	B7 B6 B5 B4 B3 B2 B1 B0	B7 B6 B5 B4 B3 B2 B1 B0	B7 96 85 94 83 82 81 80	87 96 85 84 83 82 81 80	87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 83 83 83 83 83 83	87 96 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	B7 B6 B5 94 B3 B2 B1 B0	B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80
		Data Position												
Rate Adaption		I/F Speed												
Adapilon		Signalling	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF						
		Transport Bandwidth	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	Transparent	Transport Position	B7 B6 B5 B4 B3 B2 B1 B0	B7 B6 B5 B4 B3 B2 B1 B0	87 86 95 84 83 82 81 80	B7 B6 B6 B4 B3 B2 B1 B0	B7 B6 B6 B4 B3 B2 B1 B0	87 86 85 84 83 82 81	87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	87 96 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80
	DDS	l/F Speed (kb/s)	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0						

Form 12: RS-232 DCM Configuration (continued)

Pos. #			ļ	7		8		9		10		11		12
Pos. Nam	ne											-	1	
Cct #			1	2	1	2	1	2	1	2	1	2	1	2
Cct Nam	e													
		Transport Bandwidth	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	нсм	Transport Position	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 86 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 86 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	8 4 8 8 8 8
		Data Position												
Rate Adaption		I/F Speed												
		Signalling	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF						
		Transport Bandwidth	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	12345678	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	Transparent	Transport Position	87 86 85 84 83 82 81	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	15 66 85 84 83 83 15 80	87 86 85 84 83 82 81 88	B 86 86 85 83 86 86 86	57 56 55 35 32 35 55 56 56 55 35 32 35 56 56 56 56 56 56 56 56 56 56 56 56 56	87 86 85 84 83 82 81 86	B7 86 B5 B B3 B2 B1 B8	65 65 65 65 65 65 65 65 65 65 65 65 65 6	57 66 85 35 33 33 35 56 56 85 35 33 33 35 56	B7 B6 B5 B4 B3 B2 B1 B0
	DDS	l/F Speed (kb/s)	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0						

Form 13: DNIC Data Module Circuit Configuration

Pos. #	1		2		3		-	·	5		6	
Pos. Name												
Cct #	А	В	Α	В	Α	В	Α	В	Α	В	Α	В
Cct Name												
Device	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC
Mode	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC
Device	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE
Gender	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE
Duplex	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF
Method	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL
RTS/CTS Delay (ms)												
	5	5	5	5	5	5	5	5	5	5	5	5
Character	6	6	6	6	6	6	6	6	6	6	6	6
Length	7	7	7	7	7	7	7	7	7	7	7	7
(Bits)	8	8	8	8	8	8	8	8	8	8	- 8	8
Stop	1	1	1	1	1	1	1	1	1	1	1	1
Bits	2	2	2	2	2	2_	2	2	2	2	2	2
	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD	ODD
Parity	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN
	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK
	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE
	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT
	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT
Clocking	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	1	SLAVE	SLAVE	SLAVE	SLAVE
	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEF
	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK
	Master	Master	Master	Master	Master	Master	Master	Master	Master	Master	1	Maste
Multi-drop	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave
	Disable	Disable	Disable	Disable	Disable	Disable	Disable	e Disable	Disable	Disable	Disable	Disab
Connect To	<u> </u>					<u> </u>	<u> </u>	<u></u>	<u> </u>		<u> </u>	

Form 13: DNIC Data Module Circuit Configuration (continued)

Pos. #		7		8	<u> </u>	9	Τ	10		11	Ţ	12
Pos. Name		•			1				1		-	
Cct #	А	В	Α	В	Α	В	Α	В	А	В	Α	В
Cct Name								<del>                                     </del>		†		<u>†                                      </u>
Device	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC
Mode	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC
Device	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE
Gender	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE
Duplex	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF
Method	FULL	FULL	FULL	FULL	FULL.	FULL	FULL	FULL	FULL	FULL	FULL	FULL
RTS/CTS Delay (ms)												
	5	5	5	5	5	5	5	5	5	5	5	5
Character	6	6	6	6	6	6	6	6	6	6	6	6
Length	7	7	7	7	7	7	7	7	7	7	7	7
(Bits)	8	8	8	8	8	8	8	8	8	8	8	8
Stop	1	1	1	1	1	1	1	1	1	1	1	1
Bits	2	2	2	2	2	2	2	2	2	2	2	2
	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
	ODD	ODD	ODD	ODD	ODD	ODD	000	ODD	ODD	DOO	ODD	ODD
Parity	EVEN	EVÉN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN
	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK
	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE
	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT
01	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT
Clocking	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE
	INDEP LOCK	LOCK	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP
	Master	Master	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK
Multi-drop	Slave	Slave	Master Slave	Master Slave	Master Slave	Master	Master	Master	Master	Master	Master	Master
on	Disable !	Disable	Disable	Disable	Disable	Slave Disable	Slave Disable	Slave Disable	Slave Disable	Slave Disable	Slave Disable	Slave
Connect To			3.520,5	3.02010		2104016	- Jacobio	DISQUIE	DISQUIR	Pisable	DISHORE	Disable
										<u>i</u>		

Form 13: DNIC Data Module Circuit Configuration (continued)

 Pos. #	<u> </u>			1		2		3	3	4		5		6	
Pos. Name															
Cet #				Α	В	Α	В	Α	В	A	В	Α	В	A	В
Cct Name															
			DSR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DTE	DCD	ON OFF E-É	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			стѕ	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	Inputs	į	RI	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			DTR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DCE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			ALB	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-É	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Contol Leads			RDL	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	+		DTR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-È	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DTE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			ALB	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFI E-E
	Outputs		RDL	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OF E-E
	Outputs		DSR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OF E-E
		DCE	DCD	ON OFF E-É	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OF E-E
			стѕ	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OF E-E
			RI	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	OF E-I

Form 13: DNIC Data Module Circuit Configuration (continued)

Pos. #					7		8		9		10		11	1	2
Pos. Name						1									
Cct #				Α	В	A	В	А	В	А	В	А	В	Α	В
Cct Name															
			DSR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DTE	DCD	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-É	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			стѕ	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	inputs		RI	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			DTR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DCE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			ALB	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Contol Leads			RDL	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
į			DTR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DTE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			ALB	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF È-E
	Outputs		RDL	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			DSR	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DCE	DCD	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			стѕ	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			RI	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E

Form 13: DNIC Data Module Circuit Configuration (continued)

Pos. #			1		2		3		4		5		6	
Pos. Name														
Cct #			Α	В	Α	В	_^	В	_ ^	В	Α	В	A	8
Cct Name													<del></del>	
		Transport Bandwidth	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	нсм	Transport Position	B7 B6 B5 B4 B3 B2 B1 B0	97 96 95 94 93 92 81 90	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 86 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	87 86 86 84 83 82 81 80	87 86 85 84 83 82 81 80	87 96 95 94 83 82 81 80	87 86 85 94 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80
Rate		Data Position I/F Speed												i
Adaption		Signalling	ON OFF											
		Transport Bandwidth	1 2 3 4 5 6 7 8											
	Transparent	Transport Position	97 96 95 94 83 92 81 90	B7 B6 B5 B4 B3 B2 B1 B0	B7 B6 B6 B4 B3 B2 B1 B0	B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80	97 96 95 84 83 82 81 80	B7 B6 B6 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	B7 B6 B5 B4 B3 B2 B1 B0
	DDS	I/F Speed (kb/s)	2.4 4.8 9.6 56.0											

Form 13: DNIC Data Module Circuit Configuration (continued)

Pos. #	· · · · · · · · · · · · · · · · · · ·	<del></del>	T	7	T	8	T	9		10	T	11	T	12
Pos. Nan	ne						1		<del>                                     </del>		†		1	
Cct #			Α	В	Α	В	A	В	A	В	A	В	A	В
Cct Nam	10											1	†	<del>                                     </del>
		Transport Bandwidth	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	нсм	Transport Position	B7 B6 B5 B4 B3 82 B1 B0	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B1 B0	B7 B6 B6 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80	87 86 86 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	B7 96 95 84 83 82 81 80	87 86 85 84 83 82 15 86 81 83 82 15 86
		Data Position												
Rate Adaption		I/F Speed		i				ĺ						
		Signalling	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF						
		Transport Bandwidth	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7	1 2 3 4 5 6 7 8
	Transparent	Transport Position	87 86 85 84 83 82 81 80	67 66 65 34 83 82 55 60	67 66 65 64 63 63 65 66 66	87 86 85 84 83 82 85 80	87 86 86 84 83 82 81 80	B7 B6 B6 B8 B2 B1 B0	B7 B6 B6 B3 B3 B2 B1 B0	87 86 86 84 83 82 80 80	87 86 86 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 83 83 86	87 86 85 84 83 82 85 86 86 86 86 86 86 86 86 86 86 86 86 86
	DDS	l/F Speed (kb/s)	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0						

# Form 14: X.21 DCM Circuit Configuration

	1	2 T	3 1	4	5	6	7	8	9	10	1 1	12
os. #									+	+		
Pos Name								<del>-  </del>		1	+	1
Cct #	1	1	1	1	1	1	1		<del>-</del> 1	_		
Cct Name												200
Device	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC		SYNC
Mode	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC		ASYNC
Device	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE
Gender	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE
	- 5	5	5	5	5	5	5	5	5	5	5	5
Character	6	6	6	6	6	6	6	6	6	6	6	6
Length	7	7	7	7	7	7	7	7	7	7	7	7
(Bits)	8	8	8	8	8	8	8	8	8	В	8	8
	1	1	1	1	1	1	1	1	1	1	1	1
Stop Bits	2	2	2	2	2	2	2	2	2	2	2	2
DIES	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
	ODD	ODD	ODD	ODD	ODD	ODD	ODD	000	ODD	ODD	ODD	ODD
	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN
Parity	l	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK
	MARK	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE
	SPACE	<del>├</del> ──		INT	INT	INT	INT	INT	INT	INT	INT	INT
	INT	INT	INT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT
	EXT	EXT	EXT	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE
Clocking	SLAVE	SLAVE	SLAVE	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEF
	INDEP	INDEP	INDEP			LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK
	LOCK	LOCK	LOCK	LOCK	LOCK		Master	Master	Master	Master	Master	Maste
	Master	Master	Master	Master		Master	į.	Slave	Slave	Slave	Stave	Slave
<b>M</b> ulti-drop	Slave	Slave	Slave	Slave	Slave	Slave	Slave	1			1	1
	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable	5.00.510	+
Connect To	,		1		l l			<u> </u>	<u> </u>	<u> </u>	<u></u>	<u> </u>

Form 14: X.21 DCM Circuit Configuration (continued)

Pos. #				1	2	3	4	5	6	7	В	9	10	1 11	12
Pos. Nan	10				_	1		<del>                                     </del>	<del>                                     </del>	+	†	+	+	+	+
Cct #			-	1	1	1	1	1	1	1	1	1	+-	1	+ -
Cct Nam	e							<b>†</b> "	†	+	<del>                                     </del>	1-	+-	+	1
	Inputs	DTE	-	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Control		DCE	Ç	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-É	ON OFF E-E	ON OFF E-E	ON OFF E-E
Leads	Outputs	DTE	С	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DCE		ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		Transp Bandw		1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	нсм	Transpi Position		87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	B7 B6 85 B4 B3 82 B1 B0	87 86 85 84 83 82 81	87 86 85 84 83 82 81	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81	87 86 85 84 83 82 81	87 86 85 84 83 82 81	87 86 85 84 83 82 81	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81
		Data Position	, ]											-	
Rate		I/F Spec													
Adaption		Signalli	ng	ON OFF	ON OFF	ON OFF	OFF OFF	ON OFF	ON OFF	OFF OFF	OFF OFF	ON OF∓	OFF	ON OFF	ON OFF
		Transpo Bandwid		1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	Transparent	Transpo Position	rt	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 88	87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	B7 86 85 84 83 82 81 80	87 96 85 84 83 82 81 80	87 86 85 84 83 82 81	87 86 85 84 83 82 81 80	B7 86 85 83 82 81 80	B7 B6 85 B4 B3 82 B1 B0	87 86 85 84 83 82 81	87 86 85 84 63 82 81 80
		Super-r Speed								-					
	DDS	I/F Spec (kb/s)		2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.6 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0

## Form 15: V.35 DCM Circuit Configuration

	1	2	3	4	5	6	7	8	9	10	11	12
Pos. #												
Pos Name								<del>-  </del>		1	1	1
Cct #	1	1	1	1	- 1	1	1					
Cct Name											0.010	SYNC
Device	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC		
Mode	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC		ASYNC
Device	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE	DTE
Gender	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE	DCE
Duplex	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF	HALF
Method	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL
RTS/CTS Delay (ms)												
	5	5	5	5	5	5	5	5	5	5	5	5
Character	6	6	6	6	6	6	6	6	6	6	6	6
Length	7	7	7	7	7	7	7	7	7	7	7	7
(Bits)	8	8	8	8	В	В	В	8	8	8	8	8
Stop	1	1	1	1	1	1	1	1	1	1	1	1
Bits	2	2	2	2	2	2	2	2	2	2	2	2
	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
	ODD	ODD	ODD	ODD	ODD	ODD	ODD	000	ODD	DDD	ODD	ODD
Parity	EVEN	EVEN	EVĒN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN	EVEN
Parity	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK	MARK
	SPACE		SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE	SPACE
	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT	INT
	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT	EXT
Ola al-tan	SLAVE		SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE	SLAVE
Clocking		INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP	INDEF
Ì	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK	LOCK
	<b>├</b>		Master	Master	+	Master	<del></del>	Master	Master	Master	Master	Maste
	Master	İ		Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave	Slave
Multi-drop	Slave	Slave	Slave	Disable	1	1	1	Disable	Disable	Disable	Disable	Disab
	Disable	Disable	Disable	Uisault	5.36010	1	+	+-	+-	+-	<del>                                     </del>	† —

Form 15: V.35 DCM Circuit Configuration (continued)

Pos. #				1	2	3	4	5	6	7	8	9	10	11	12
Pos. Nai	me						1	<u> </u>	<del>                                     </del>		-	1	1		1
Cct #				1	1	1	1 7	1	1	1	1	1	1	1	1
Cct Nar	ne														
	Inputs	DTE	DCD	ON OFF E-€	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Control		DCE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
Leads		DTE	RTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
	Outputs		ALB	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		DCE	DCD	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
			CTS	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E	ON OFF E-E
		Transport Bandwidtl		1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	нсм	Transport	Transport Position		B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81 80	B7 B6 85 B4 B3 B2 B1 B0
		Data Posit	ion												
Rate Adaption		I/F Speed													
		Signatting		S F	OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF	ON OFF
		∓ransport Bandwidth	ransport andwidth	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
	Transparent	Transport Position	Position .	87 86 85 84 83 82 81	87 86 85 84 83 82 81	B7 86 85 84 83 82 81 80	B7 86 85 84 83 82 81	87 86 85 84 83 82 81	87 86 85 84 83 82 81	87 86 85 84 83 82 81 80	B7 B6 B5 B4 B3 B2 B1 B0	87 86 85 84 83 82 81 80	87 86 85 84 83 82 81	87 86 85 84 83 82 81 80	B7 66 85 84 83 82 81 80
		Super-rate	Speed												
	DDS	DS I/F Speed (ktb/s)	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	2.4 4.8 9.6 56.0	

Form 16: OCU Module and Circuit Configuration

De	sition	Variant		Circuit	Faul	t	Switc	h 56	interf		Connect
7	Name	Number	#	Name	Signall	ing			Speed		То
		0693-01	1		Seized	ldie	ON	OFF	2400 4800	9600 56000	
		0693-02	2		Seized	ldie	ON	OFF	2400 4800	9600 56000	
+	<u> </u>	0693-01	1		Seized	ldie	ON	OFF	2400 4800	9600 56000	
		0693-02	2		Seized	ldie	ON	OFF	2400 4800	9600 56000	
-			1		Seized	ldie	ON	OFF	2400 4800	9600 56000	
		0693-01	2		Seized	Idle	ON	OFF	2400	9600	· · ·
	_	0693-02	2		00,200				4800	56000	
		0693-01	1		Seized	ldle	ON_	OFF	2400 4800	9600 56000	
		0693-02	2		Seized	ldle	OΝ	OFF	2400 4800	9600 56000	
+		0693-01	1		Seized	ldie	ON	OFF	2400 4800	9600 56000	
<b>`</b>		0693-02	2		Seized	ldle	ON	OFF	2400 4800	9600 56000	
+		0000 01	1	. <u> </u>	Seized	idle	ON	OFF	2400 4800	9600 56000	
		0693-01 0693-02	2		Seized	idle	ON	OFF	2400 4800	9600 56000	
-		<del> </del>	1	<u> </u>	Seized	idle	ON	OFF	2400	9600	
7		0693-01	_		Seized	ldle	ON	OFF	4800 2400	56000 9600	
		0693-02	2		Seizeu				4800	56000	
8		0693-01	1		Seized	idle	ON	OFF	2400 4800	9600 56000	
		0693-02	2		Seized	ldle	ON	OFF	2400 4800	9600 56000	
+		0693-01	1		Seized	idle	ON	OFF	2400 4800	9600 56000	
9		0693-02	2		Seized	Idle	ON	OFF	2400 4800	9600 56000	
-+		0000.01	1		Seized	Idle	ON	OFF	2400 4800	9600 56000	
10		0693-01	2		Seized	ldle	ON	OFF	2400 4800	9600 56000	1
_		_	1	<del> </del>	Seized	ldle	ON	OFF	2400	9600	<del> </del>
11		0693-01	2	<del> </del> -	Seized	ldle	ON	OFF	4800 2400	56000 9600	+
		0693-02	↓_	<u> </u>					4800	56000 9600	<del>                                     </del>
12		0693-01	1		Seized	idle	ON	OFF	2400 4800	56000	
- 1		0693-02	2		Seized	ldle	ON	OFF	2400 4800	9600 56000	

Form 17: Access Level Settings

Parameter		Acces	ss Level	
	4	3	2	1
CONFIG				
POSITION				
CIRCUIT			1	
CONNECT			<del></del>	
SYNCH				
HOUSE				<del></del>
SER_PORT_1				· · · · · · · · · · · · · · · · · · ·
SER_PORT_2				-
DATE				<u> </u>
TIME		-	<u> </u>	-
NODE_NAME				
MORE				
SESSN_TIME		, ,		
NODE_NUM	·			
NOC-NUM				
MAINT				
DIAG	-			
DISPLAY				<del>                                     </del>
UNDO_MAINT				
ON_CIRCUIT		<u> </u>	-	
ON_MODULE				
MORE		<u>_</u>		
BACKUP				
RESTORE				
VERIFY		· · · · · · · · · · · · · · · · · · ·		
VIEW_NET				
NVM_DATA				
ALARMS				
MAJOR				
MINOR			<u> </u>	<del> </del>
DIAGNOSTIC				<del>                                     </del>
EXTNL_ALRM			· · · · · · · · · · · · · · · · · · ·	<del> </del>
CONFIG		<del></del>		
MORE				
LOGGING				<del></del>

## Form 18: Alarm Queue Classifications

Alarm	#	Major	Minor	Diagnostic
Busy Out Applied	79			
CSU Loopback Activated	82			
Database Reset	106			
Device Failed	49			
External Alarm Raised	20			
Failed State	72			
Framing Error Rate Exceeded	51			
Module Failure	58			
Module Removed	60			
Module Reset	108			
NVM Error	4			
Power Rail failed	64		ļ	
Red Alarm	8			
Revision/Feature Mismatch	57			
Ringing Generator Failed	66			
Signalling Fault	107			
Super-rate Conn Removed	123			
Synch Source Changed	55			
Synch Source Failure	36			
Synch Src Recovery Failed	56			
System Advisory (DA)	17			
System Advisory (SA)	2			
Tail Circuit Gone	61			
Wrong Interface Card	48			
Wrong Module in Position	3			
Wrong/No Module Installed	37			
Yellow Alarm	10			

#### Form 19: System Timing

System	System Timing Recovery										
Select	Deselect		30 seconds	1 minute	10 minutes	30 minutes	Manual	Unlimited			
Enable	Disable										



Newbridge has attempted to accurately describe the intended functionality and operational procedures of this product. However, Newbridge does not warrant that the product will meet your particular requirements or that the product will not be subject to modifications.

Selected functionality may not be available in this release. Please contact your Newbridge regional sales office for specific release dates.

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# 3624 MainStreet Intelligent T1 Channel Bank

Release 7 Generic 6107/6207

Ordering Information





#### **Foreword**

The documentation set of the 3624 MainStreet Intelligent T1 Channel Bank contains the following manuals:

- ☐ Installation (Part number 95-B200-01-00-B)
- ☐ Configuration (Part number 95-B400-01-00-B)
- ☐ Maintenance (Part number 95-B500-01-00-B)
- Quick Reference Guide (Part number 95-B450-01-00-B)
- □ Node Configuration Forms (Part number 95-B460-01-00-B
- Ordering Information (Part number 95-B050-01-00-B)
- ☐ Index (Part number 95-B005-01-00-B)
- ☐ Content Summary (Part number 95-B000-01-00-B)

**Installation:** This manual provides the instructions required to install and set up the 3624.

**Configuration:** This manual provides the instructions required for all configuration operations for the *3624*.

**Maintenance:** This manual explains all maintenance functions and how to perform them.

**Quick Reference Guide:** This manual contains a summary of the configuration and maintenance commands.

**Node Configuration Forms:** This manual contains a series of forms to fill out for planning and recording the configuration settings.

**Index:** This manual contains the indexes for the Installation, Configuration and Maintenance manuals.

**Content Summary:** This manual provides a listing of the main content of the manuals in the documentation set.

#### Ordering Information

This manual lists the available 3624 parts and accessories, and their order numbers.

Not all 3624 MainStreet systems include all of the components or features described in this manual. The components included and the features supported depend on the type of system and the generic software. This documentation set describes software generics 6107 and 6207, Release 7.

This documentation set describes the management of the 3624 node using the NMTI. A node management session can be initiated from the 4600 MainStreet family of network managers. If you are using a network manager, the menus and screens displayed by the network management software are the similar to those described in this documentation. Refer to the 4600 documentation for more detailed information.

#### **Symbols**

Several symbols, explained below, are used in the 3624 documentation to draw your attention to important information.



DANGER: Danger indicates that the described activity or situation may pose a threat to personal safety.



WARNING: A warning indicates that the described activity or situation may/will cause equipment damage.



CAUTION: A caution indicates that the described activity or situation may/will cause service interruption.



NOTE: Notes provide information that is or may be of special interest.

# **Table of Contents**

#### Foreword

LOI	CHOIM		
	O d an	ing Information	iii
	Order	mg mioritation	iv
	Symb	ols	
Tab	le of C	ontents	
		Parts	1-1
	1.	Parts	7_1
	2	Accessories	

## 1. Parts

The listed parts are available from your Newbridge representative.

	Part	Part Number
747 19	3624 Basic System 115 V	90-0336-11
Basic System: Wall-mount	3624 Basic System 115 V MX	90-0336-12
	3624 Basic System 48 V	90-0337-11
	3624 Basic System 48 V MX	90-0337-12
	acad D. Contom 115 V Drawer	90-0336-21
Rack-mount	3624 Basic System 115 V Drawer 3624 Basic System 115 V MX Drawer	90-0336-22
	3624 Basic System 48 V Drawer	90-0337-21
	3624 Basic System 48 V MX Drawer	90-0337-22
		90-0161-01
Control Card Modules	CSU module	90-0168-01
	DSX-1 module	90-0567-01
	LIM module	
	TOTAL dealer	90-0159-01
Resource Card Modules	DTU module	90-0160-01
	DDS module	90-0512-01
	Tone module	
	Universal Interface card (48 V)	90-0154-02
Interface Cards: Wall-mount	Universal Interface card	90-0154-05
	LGS Interface card (48 V)	90-0155-02
	LGS Interface card (40 1)	
D 1	Universal Interface card (48 V)	90-0154-03
Rack-mount	Universal Interface card	90-0154-06
	LGS Interface card (48 V)	90-0155-03
	EGS Interface care (12 17)	
	LGS module	90-0156-02
Voice Interface Modules	LGS module (0/-7 dB), pkg of 6	90-0097-02
	LGS module (48 V)	90-01 <b>56-</b> 03
	LGS module (48 V), pkg of 6	90-0097-03
	LGS module (+4/-10 dB)	90-0156-06
	LGS module (+4/-10 dB), pkg of 6	90-0097-06
	LGS module (LR)	90-0156-07
	LGS module (LR), pkg of 6	90-0097-07
	LGS module (CI)	90-0156-08
	LGS module (CI), pkg of 6	90-0097-08
	LGE module (0/-7 dB)	90-0526-01
	LGE module (0/-7 dB), pkg of 6	90-0525-01
	LGE module (+4/-10 dB)	90-0526-03
	LGE module $(+4/-10 \text{ dB})$ , pkg of 6	90-0525-03
	E&M module (Type I)	90-0157-01
	E&M module (Type I), pkg of 6	90-0098-01
	E&M module (+4/-10 dB)	90-0157-03
	E&M module (+4/-10 dB), pkg of 6	90-0098-03

	Part	Part Number
	MRD module, pkg of 6	90-0626-01
	4W TO module	90-0157-05
	4W TO module, pkg of 6	90-0098-05
Data Interface Modules	DNIC module	90-0158-01
	DNIC module, pkg of 6	90-0099-01
	RS-232 DCM	90-0611-01
	RS-232 DCM, pkg of 6	90-0610-01
	OCU I module	90-0693-01
	OCU I module, pkg of 6	90-0692-01
	OCU II module	90-0693-02
	OCU II module, pkg of 6	90-0692-02
	X.21 DCM	90-0432-01
	X.21 DCM, pkg of 6	90-0431-01
	V.35 DCM	90-0523-01
	V.35 DCM, pkg of 6	90-0520-01
	3624 Blank Module, pkg of 3	90-1374-01
2600 MainStreet Data	2601 MainStreet RS-232 DTU (110V)	90-0044-01
Termination Units	2601 MainStreet RS-232 DTU-ANM (110V)	90-0468-01
	2602 MainStreet X.21 DTU (110V)	90-0107-01
	2602 MainStreet X.21 DTU-ANM (110V)	90-0500-01
	2603 MainStreet V.35 DTU (110V)	90-0108-01
	2603 MainStreet V.35 DTU-ANM (110V)	90-0501-01
	2606 MainStreet Sync/Async RS232 DTU 110	90-0883-01
	2608 MainStreet Octal RS-232 DTU (110V)	90-0366-01
	2610 MainStreet PAD (110V)	90-0882-01
	DTU wall-mount plate	90-0340-01
	Rack-mount shelf (115 V)	90-0531-01
Miscellaneous	Control Card CB	90-0166-01
	Control Card MX	90-0166-02
	Control Card 2	90-0166-04
	3624 Installation kit	90-0530-11
	Installation kit – 3624/3630	90-0530-01
	RS-232 Distribution Panel	90 -0350-02
	Software 6107	90-0167-11
	Software 6207	90-0167-12
Wall-mount	Chassis assembly (AC)	90-0336-99
	Chassis assembly (DC)	90-0337-99
	AC power supply 60 V Ringer 115 V	90-0163-01
	AC power supply 90 V Ringer 115 V	90-0163-02
	DC Power supply 60 V Ringer 48V	90-0164-01
	DC Power supply 90 V Ringer 48V	90-0164-02
	Rack-mount kit (19-inch)	90-0338-01
	Rack-mount kit (23-inch)	90-0338-02
Rack-mount	AC power supply 90 V Ringer 115 V	90-0163-03
	DC Power supply 90 V Ringer 48V	90-0164-03
	36SM Rack Blanking Plate Kit	90-1313-01
	36SM Rack Shelf Assembly	90-1313-02
	36SM Rack DC Connector	90-1313-03
	36SM Rack Rack Mount 23" Adapters	90-1313-04

	Part	Part Number
Documentation	3624 Release 7 Documentation Package 3624 Release 7 Index of Practices 3624 Release 7 Index 3624 Release 7 Ordering Information 3624 Release 7 Installation Manual 3624 Release 7 Configuration Manual 3624 Release 7 Quick Reference Guide 3624 Release 7 Node Configuration Forms 3624 Release 7 Maintenance	90-1501-01 95-B000-01-00-B 95-B005-01-00-B 95-B050-01-00-B 95-B200-01-00-B 95-B400-01-00-B 95-B460-01-00-B 95-B500-01-00-B
	Small Mux Family Interface Specification	95-B100-01-00-B
	2600 DTU Owner's Manual 2600 DTU Rack-mount Shelf Installation Guide 2606 DTU Owner's Manual	95-DS01-00-F0 95-DS04-00-B0 95-1071-01-A0
	RS-232 Distribution Panel Owner's Manual 3624 Installation Template	95-1020-01-A0 95-CB22-00-00-B

# 2. Accessories

The listed accessories are available from you Newbridge representative.

	Part	Part Number
		90-0138-01
For Serial Port	RJ45 to RJ45 1-meter cable	90-0120-01
Connections	RJ45 to RJ45 2-meter cable	90-0121-01
(J5 and J6)	RJ45 to RJ45 5-meter cable	90-0122-01
	RJ45 to RJ45 10-meter cable	90-0139-01
	RJ45 to RJ45 15-meter cable	y0 <b>01</b> 57 01
	For connecting a modem to connector J5 (DTE):	90-0026-01
	DB25 Male adapter	90-0020-01
	DB25 Female adapter	9Ú-0141-01
	For connecting a terminal to connector J6 (DCE):	00.0005.01
	DB25 Male adapter	90-0025-01
	DB25 Female adapter	90-0045-01
E T1	For a 3624 MainStreet equipped with a CSU module	
For T1	or for connection to an external CSU equipped with	
Connections (J4)	an RJ45 or RJ48 8-wire jack:	
	RJ45 to RJ45 2-meter cable	90-0120-01
	For connection to an external CSU equipped with	
	bantam jacks:	00.0150.01
	RJ45 to RJ45 2-meter cable	90-0120-01
	RJ45 to RJ45 10-meter cable	90-0122-01
	RJ45 to RJ45 15-meter cable	90-0139-01
	RJ45 female surface mount jack	90-0128-01
	For connection to standard telco wiring:	00.0100.01
	RJ45 to RJ45 2-meter cable	90-0120-01
	RJ45 to RJ45 10-meter cable	90-0122-01
	RJ45 to RJ45 15-meter cable	90-0139-01
	RJ45 female surface mount jack	90-0128-01
		00.0054.01
For Alarm	RJ11 cables to spade lugs	90-0054-01
Connections (J7)		
	AMP Champ Male to AMP Champ Female 2-meter cable	90-0555-01
For Voice and	AMP Champ Male to AMP Champ Female 4-meter cable	90-0555-02
Data Circuit	AMP Champ Male to AMP Champ Female 8-meter cable	90-0555-03
Connections	AMP Champ Male to AMI Champ remaie o meter due	90-0555-03
(J1, J2, J3)	AMP Champ 66-series punch block	90-0080-01
	AMP Champ to Krone punch block	
	DB9 Female to RJ45 adapter	90-0067-01
Adapters	DB9 Male to RJ45 adapter	90-0063-01
	Circular 8 to RJ45 adapter	90-0135-01
	Circular o to Kj45 adapter	



Newbridge has attempted to accurately describe the intended functionality and operational procedures of this product. However, Newbridge does not warrant that the product will meet your particular requirements or that the product will not be subject to modifications.

Selected functionality may not be available in this release. Please contact your Newbridge regional sales office for specific release dates.

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# 3624 MainStreet Intelligent T1 Channel Bank

Release 7 Generic 6107/6207

**Master Index** 





## Index

0_150FT, CO D1-3 0dB, CO D1-3, D1-4 10_MIN, CO A1-12, CO H1-4 1200, CO B1-5 151_450FT, CO D1-3 15_MIN, CO A1-12 15dB, CO D1-3 1_BIT, CO F1-7, CO F2-9, CO F3-8 2_BIT, CO F1-7, CO F2-9, CO F3-8 1_MIN, CO H1-4 2-WIRE, CO E3- 2400, CO B1-6, CO F4-3 2601, 2602, 2603 DTUs loopback A, MA 4-4 loopback B, MA 4-4	4W TO module, CO F5-1 – F5-4 installing, IN 7-3 pin/signal assignment, IN 9-4, IN 9-7, IN 9-8 removing, IN 7-4 specifying a module, CO C1-9 56000, CO F4-3 5_BITS, CO F1-9, CO F2-7, CO F3-8 5_MIN, CO A1-12 600, CO B1-5 6_BITS, CO F1-9, CO F2-7, CO F3-8 7.5dB, CO D1-3 7_BITS, CO F1-9, CO F2-7, CO F3-8 8_BITS, CO F1-9, CO F2-7, CO F3-8 9600, CO B1-5, CO F4-3
loopback C, MA 4-5	
loopbacks, MA 4-4	
initiating, MA 4-5	A
removing, MA 4-5	<u></u>
2606 DTU	access levels, CO B3-1 - B3-7
loopback A, MA 4-6	defining, CO B3-4
loopback B, MA 4-6	level 0, CO B3-2
loopback C, MA 4-7	level 5, CO B3-1
loopbacks, MA 4-6	levels 1 to 4, CO B3-1
initiating, MA 4-7	suggested definitions, CO B3-3
removing, MA 4-7	table, CO B3-4
	ACK, MA, 2-7
2608 and 2610 DTUs	ACK_ALL MA, 2-7
loopback A	adjusting circuit configuration, CO C2-3
port A, MA 4-8	alarm conditions
loopback B	Busy Out Applied, MA 2-2
port A, MA 4-8	CSU Loopback Activated, MA 2-2
loopback C	
port A, MA 4-9	Database Reset, MA 2-2
port B, MA 4-9	default, MA 2-4
loopbacks, MA 4-8	Device Failed, MA 2-2
initiating, MA 4-9	External Alarm Raised, MA 2-2
removing, MA 4-10	Failed State, MA 2-2
300, CO B1-5	Framing Err Rate Exceeded, MA 2-2
30_MIN, CO A1-12, CO H1-4	maximum in queue, MA 2-5
30_SEC, CO H1-4	Module Failure, MA 2-2
4-WIRE, CO E3-2	Module Removed, MA 2-2
451_655FT, CO D1-3	Module Reset, MA 2-2
4600 software, CO B1-3	NVM Error, MA 2-2
4800, CO B1-5, CO F4-3	Power Rail Failed, MA 2-2
	Red Alarm, MA 2-2
	Revision/Feature Mismatch, MA 2-2

Ring Generator Failed, MA 2-2
Signalling Fault, MA 2-2
Super-rate Conn Removed, MA 2-2
Synch Source changed, MA 2-2
Synch Source Failure, MA 2-2
Synch Src Recovery Failed, MA 2-2
System Advisory (DA), MA 2-3
System Advisory (SA), MA 2-3
table, MA 2-2 – 2-3
Tail Circuit Gone, MA 2-3
Wrong Interface Card, MA 2-3
Wrong Module in Position, MA 2-3
Wrong/No Module Installed, MA 2-3
Yellow Alarm, MA 2-3
alarms
acknowledging all, MA 2-7
acknowledging one, MA 2-7
deleting one, MA 2-6
deleting all, MA 2-6
diagnostic, MA 2-3
logging, MA 2-7
to a device, MA 2-7
to the NOC via modem, MA 2-7
to the NOC via the T1 link MA 2-7
major, MA 2-3
queue display, MA 2-5, 2-6
reclassifying, MA 2-4
viewing, MA 2-6
ALARMS, MA 2-4
ALRM_COUNT, MA 1-5
alarm clearing time
for Red alarm, CO D3-7
for Yellow alarm, CO D3-7
alarm declaration time
for Red alarm, CO D3-6
for Yellow alarm, CO D3-6
ALARM_TIME, CO D3-6, D3-7, CO D4-2
ALB, CO F1-7, CO F3-7
antistatic precautions
for rack-mount, IN 4-12 for wall-mount, IN 4-12
antistatic wrist strap, IN 3-1, IN 4-12
AS_PRESENT, CO C1-10
assigning a node number, CO I1-2 assigning failure threshold, CO H1-3
ASYNC, CO F1-3, CO F2-2, CO F3-3
audio transmission, CO E3-2
configuring, CO E3-2
AUTO, CO H1-4
automatic log off, CO A1-12
automatic recovery, CO H1-4
MALOMINI TOLOTOLT, CO III-T

#### В

B8ZS, CO D1-2 backing up the database, MA 5-3 BACKUP, MA 5-3 baud rate. CO B1-5 BAUD\_RATE, CO B1-5 Binary 8-zero suppression, CO D1-1 BKGND\_TEST, MA 1-5 blank modules, CO F3-14, IN 7-6 blanking plate attaching, IN 8-13 - 8-16 front, IN 8-15 rear, IN 8-14, IN 8-16 busy out circuits and super-rate circuits, MA 3-8 busy out circuits, MA 3-8 busy-out definition, MA 3-8 BUSY\_OUT, MA 3-8

#### C

cabinet member, IN 8-5 tabs. IN 8-10 cable connector type for LGS card, IN 9-1 0 type for rack-mount units, IN 9-12 type for Universal card, IN 9-2 cable support bracket, IN 12-7 CANCEL, CO A1-8, MA 5-3, MA 5-7 Canadian Department of Communications, see CDC CDC, IN v Class A limits, IN vi load number, IN v regulations, IN v Channel Service Unit, see CSU CHAR\_LEN, CO F1-9, CO F2-7, CO F3-8 Character length, see CHAR\_LEN chassis of the rack-mount drawer, IN 1-4 of the wall-mount unit, IN 1-4 CHNG\_PSSWD, CO B3-4, CO B3-6 circuit connecting, CO C3-1 connecting to CPSS, CO C3-2 disconnecting, CO C3-3

display of cross-connections, CO C3-4	configuring
circuit breaker	control signals
location DC wall-mount, IN 12-4	DNIC module, CO F1-8
location DC rack-mount, IN 12-4	RS-232 DCM, CO F2-6
circuit cross-connections	V.35 DCM, CO F3-7
and data inversion, CO D2-2	X.21 DCM, CO F3-7
and robbed bit signalling, CO D2-1	DDS rate adaption, CO G3-3
and lobbed bit signamity, co 22 -	flow control, CO B1-6
circuit diagnostic tests	HCM rate adaption, CO G2-3
disabling, MA 3-3	multi-drop data bridge
enabling, MA 3-3	DNIC module, CO F1-12
circuit diagnostic tests, MA 3-2	RS-232 DCM, CO F2-11
circuit identifiers	V.35 DCM, CO F3-13
table, CO C2-1	X.21 DCM, CO F3-13
circuit names, CO C2-2	seven-segment display;, MA 1-5
circuit numbering	transparent rate adaption, CO G1-3
data circuits, CO C2-1	CONNECT, CO C3-1, C3-3, C3-4
DNIC circuits, CO C2-1	CONNECT_ALL, CO C3-2
T1 circuits, CO C2-1	connecting
voice circuits, CO C2-1	to CPSS, CO C3-2, CO I1-5
Circuit status LED	to FDL, CO I1-5
4W T0, MA 1-8	to the Network line, IN 10-2 - 3
DNIC, MA 1-8	to the NMTI, IN 11-4
E&MS, MA 1-8	connector J4
LGE, MA 1-8	pin/signal assignment, IN 10-1
LGS, MA 1-8	connector J7
MRD, MA 1-8	alarm circuit, IN 13-3
OCU, MA 1-8	location on Control card, IN 13-1
RS-232 DCM, MA 1-8	pin/signal assignment, IN 13-2
V.35 DCM, MA 1-8	connectors J1 (LGS card)
X.21 DCM, MA 1-8	pin/signal assignment, IN 9-11
Clear To Send, see RTS/CTS delay	connectors J1 and J3 (Universal card (48 V))
CLEAR, CO D3-7	pin/signal assignment, IN 9-7
clearing	connectors J1, J2 and J3 (Universal card)
Yellow alarm, CO D4-2	pin/signal assignment, IN 9-4
clocking, CO F1-12 - 14, CO F2-10 - 12,	connectors J2 (Universal card (48 V))
CO F3-12 – 14	pin/signal assignment, IN 9-8
RS-232 DCM, CO F2-8	Control card, IN 1-5, IN 5-1 – 5-9
V.35 DCM, CO F3-9	installing modules, IN 5-4
X.21 DCM, CO F3-9	module locations, IN 5-1, IN 5-4
CLOCKING, CO F1-10, CO F2-10, CO F2-12,	module positions, IN 1-6
CO F3-11	
command line CO A1-3	module types, IN 5-2 serial ports, IN 1-6
communications software, CO B1-3	serial ports, in 1-0
CLOSED_CCT, MA 2-8	removing modules, IN 5-6
configuration database	control signals
backing up, MA 5-4	and DTUs, CO F1-7
resetting, MA 5-3	and multi-drop data bridge, CO F1-13
restoring, MA 5-7	DNIC module
verifying, MA 5-5	table, CO F1-7
CONFIG_ALL, CO C1-12	types, CO F1-6

RS-232 DCM	selecting voice, CO D2-3
and device gender, CO F2-5	data circuits
table, CO F2-5	circuit numbering, CO C2-1
V.35 DCM	data communications equipment, see DCE
and HCM rate adaption, CO F3-6	data inversion
table, CO F3-6	and circuit cross-connections, CO D2-2
X.21DCM	database
and HCM rate adaption, CO F3-6	backing up, MA 5-3
table, CO F3-6	resetting, MA 5-3
Control X, CO A1-10	
	restoring, MA 5-6
copy adjust	verifying, MA 5-5
and multi-drop data bridge, CO F1-13	database backup, MA 5-1
COPY-ADJ, CO C2-3, CO G1-3	database management
COPY_TO, CO C2-3	using a 4600-series, MA 5-1
copying circuit configuration, CO C2-3	using a PC, MA 5-1
CPSS	database restore, MA 5-1
and robbed bit signalling, CO D2-1	database verification, MA 5-1
and trunk conditioning, CO D3-1	data module, see DNIC module, see RS-232
messages, CO I1-3	DCM, see X.21 DCM, see V.35 DCM, see
CPSS node ID, CO I1-1	OCU
CPSS, CO B1-2, B1-3, MA 5-3	data modules
CPSS_LONG, CO B1-2	specifiying DNIC, CO C1-9
CPSS_MODEM, CO B1-2, CO I1-4, MA 5-3	specifiying OCU, CO C1-7
cross-connecting, CO C3-1	specifying RS-232 DCM, CO C1-8
super-rate circuits, CO F3-22 – 27	specifying V.35 DCM, CO C1-9
V.35 DCM, CO F3-21	
	specifiying X.21 DCM, CO C1-9
X.21 DCM, CO F3-21	data position
cross-connections	and multi-drop data bridge, CO F1-13
display, CO C3-4	data structure
quick configuration, CO C3-2	DNIC, CO F1-8
CSU loopback	RS-232 DCM, CO F2-6
DDS, MA 4-15	V.35 DCM, CO F3-7
CSU Loopback Activated Alarm, CO D3-2	X.21 DCM, CO F3-7
CSU module	data termination equipment, see DTE
line build-out switch, IN 5-6	Data Termination Units, CO F1-3, IN 5-2,
CSU, IN 5-3	IN 5-3
CSU network-directed loopback, MA 4-16	clocking, CO F1-13
CSU_LP_OFF, CO D3-5	control signals, CO F1-8
CSU_LP_ON, CO D3-5	loopbacks, MA 4-4 – 4-11
CTRL_LEADS, CO F1-7, CO F2-6, CO F3-7	DATA, CO C1-7 – C1-9, CO D2-3
CTS, CO F1-7, CO F2-6, CO F3-7	DATA_POSN, CO G2-10
C15, C0 11 7, C0 12-0, C0 13-7	date
	format, CO B2-2
D	setting, CO B2-2
	DATE, CO B2-2
D4, see D4 framing	DC power distribution circuit board, IN 12-7
D4 framing, CO D1-4	DC power interconnect cable, IN 12-8
setting, CO D1-4	DC power terminal block, IN 12-8
D4_FRAMING, CO D1-4	DCD, CO F1-7, CO F2-6, CO F3-7
data area CO A1-2	DCE, CO F1-4, CO F2-3, CO F3-3
data bit inversion, CO D2-2	•
selecting data, CO D2-3	

DCM circuits	DSX-1
and robbed bit signalling, CO D2-1	DIGITTIME, CO E1-6
DCM loopbacks	DIRECTED, MA 3-3, MA 3-5
initiating, MA 4-12	directed diagnostic tests, MA 3-3
Loopback B, MA 4-11	DISAB_DIAG, MA 3-3
Loopback C, MA 4-12	DISABLE, CO F1-14, CO F2-125, CO F3-13,
removing, MA 4-12	CO H1-3, MA 2-6, MA 3-2
DDS module, IN 5-3	disabling multi-drop data bridge
DDS rate adaption, CO G3-1 – 5	DNIC, CO F1-11
and DDS module, CO G3-1	RS-232 DCM, CO F2-12
and other loopbacks, MA 4-16	V.35 and X.21 DCM, CO F3-13
configuring, CO G3-3	DISCON_ALL, CO C3-3
format for 56 kb/s channels, CO, G3-2	DISCONNECT, CO C3-3
format for sub-rate channels, CO, G3-2	disconnecting circuits, CO C3-3, CO C3-4
interface speed, CO G3-5	CPSS, CO I1-6
overview, CO G3-2	FDL, CO I1-5
DDS, CO C1-3, CO G3-3	super-rate circuits, CO F3-23
loopbacks types, MA 4-15	disconnection
DECLARE, CO D3-6	quick configuration, CO C3-3
defining access levels, CO B3-5	displaying
DELETE, MA 2-6	cross-connections, CO C3-4
DELETE_ALL, MA 2-6	module positions, CO C1-2
DESELECT, CO H1-3	displaying information
device genders	on interface modules, MA 3-9
DNIC, CO F1-3	DNIC, CO C1-10
RS-232 DCM, CO F2-3	DNIC circuit
V.35 DCM, CO F3-3	and robbed bit signalling, CO D2-1
X.21 DCM, CO F3-3	circuit numbering, CO C2-1
device modes	signalling leads, MA 3-6
DNIC, CO F1-2	DNIC module, CO F1-1 – 1-11
RS-232 DCM, CO F2-2	and DTUs, CO F1-3
V.35 DCM, CO F3-2	and rate adaption, CO F1-1
X.21 DCM, CO F3-2	circuit numbering, CO C2-1, CO F1-1
	control signals
diagnostics LED functions, IN 12-12	table, CO F1-7
start-up, IN 12-10	types, CO F1-6
diagnostics line CO A1-3	data structure, CO F1-8
diagnostic tests, MA 3-1 – 3-5	device gender, CO F1-3
directed, MA 3-3	device mode, CO F1-2
on a specific circuit, MA 3-2	duplex method, CO F1-4
stopping directed, MA 3-4	installing, IN 7-3
table, MA 3-1	pin/signal assignment, IN 9-4, IN 9-7,
viewing current test, MA 3-4	IN 9-8
viewing fault list, MA 3-4	removing, IN 7-4
viewing list, MA 3-4	RTS/CTS delay, CO F1-5
viewing, MA 3-4	specifiying, CO C1-9
Dial Pulse Originating, CO E1-4, CO E1-5	DPO, CO E1-4
definition, CO E1-5	DPT, CO E2-5
Dial Pulse Terminaing	drawer member, IN 8-5
definition, CO E2-4	tabs, IN 8-9
Digital Dataphone Service, see DDS	DSR, CO F1-7, CO F2-6
Digital Signal Cross-connect Level 1, see	
Digital Digital Cross confect Level 5, 111	

DSU loopback	ESF framing, CO D1-4
DDS, MA 4-15	setting, D1-4
DSX-1, IN 5-2	ESF, CO D1-4
DTE, CO F1-4, CO F2-3, CO F3-3	EVEN, CO F1-10, CO F2-8, CO F3-9
DTR, CO B1-6, CO F1-7, CO F2-6	extended superframe format, see ESF
DTU, IN 5-3	EXTENDED, CO E3-4
DTUs, see Data Termination Units	EXTERNAL, CO F1-12, CO F2-10, CO F3-11
DTU module, IN 5-6, IN 5-8	external alarm
and control signals, CO F1-7	disabling, MA 2-9
and HCM rate adaption, CO G2-3	enabling, MA 2-9
and network management, CO I1-5	indication, MA 2-8
clocking, CO F1-11	external alarm
Loopback A, MA 4-4	contact ratings, IN 13-3
Loopback B, MA 4-4	functions, IN 13-2
loopback C, MA 4-5	external alarm connector, IN 13-1
loopbacks, MA 4-4	EXTNL_ALRM, MA 2-9
duplex method, CO F1-4, CO F2-3, CO F3-4	
and multi-drop data bridge, CO F1-13,	
CO F3-4	F
and RTS/CTS delay, CO F1-4, CO F2-3,	<u> </u>
ĆO F3-4	Facility Data I had not EDI
	Facility Data Link, see FDL
	FAILED_OFF, CO D3-5
E	FAILED_ON, CO D3-5
	failure recovery
E&M module, CO E3-1 – E3-4	automatic, CO H1-4
audio transmission, CO E3-2	manual, CO H1-4
fault signalling, CO E3-5	selecting, CO H1-4 timed, CO H1-4
installing, IN 7-3	failure threshold
pin/signal assignment, IN 9-4, IN 9-7,	
IN 9-8	assigning, CO H1-3
removing, IN 7-4	automatic disable, CO H1-3 fault class
loopback MA 4-2	
specifying, CO C1-6	configuring, CO D3-5
TLP ranges, CO E3-4	CSU loopback activated, CO D3-5 failed state, CO D3-5
variants	framing error rate exceeded, CO D3-5
0157-01, CO C1-6	red, CO D3-5
0157-03, CO C1-6	yellow, CO D3-5
EARLIER, MA 2-6	FAULT_LIST, MA 3-4
EMPTY, CO C1-9	fault signalling
ENAB_DIAG, MA 3-3	E&M module, CO E3-5
ENABLE, CO H1-2, MA 2-7, MA 3-2	LGE module, CO E2-5
END_TO_END, CO F1-7, CO F2-6, CO F3-7	LGS module, CO E1-7
editing signalling leads, MA 3-7	MRD module, CO E4-7
entering the NOC number, CO I1-3	OCU module, CO F4-4
equipment loopback, T1 link, MA 4-14	options, CO D245
EQUIPMENT, MA 4-15	selecting, CO D2-4
Err Rate Exceeded Alarm, CO D3-2	T1 circuits, CO D2-4
ERROR_OFF, CO D3-5	FAULT_SIG, CO D2-4, CO E1-7, CO E2-5,
ERROR_ON, CO D3-5	CO E3-6, CO E4-4, CO F4-45
Escape A, CO B3-5	FCC
Escape R, CO A1-10	Class A limits, IN vii
, , <del></del>	CINCO A A MARIELLO, JUN VIII

regulations, IN vi REN, IN vi FDL, CO D1-4, CO I1-5 Federal Communications Commission, see FCC flow control, CO B1-6 FLOW_CTRL, CO B1-6 Foreign Exchange Office, CO E2-1 Foreign Exchange Subscriber, CO E1-1	rack-mount, IN4-11 temporary, for AC, IN 4-2 the wall-mount, IN 4-1 grounding stud for wall-mount, IN 4-4 shelf ground stud, IN 4-8 GS, CO E1-4, CO E2-5 GS_DNIS, CO E1-5 post-wink duration, CO E1-6 wink duration, CO E1-6
framing bit, CO G2-2 front and rear blanking plates, IN 8-6 Full-duplex transmission, CO F1-4, CO F2-3, CO F3-4	GS_EM, CO E1-4
FULL_DPLX, CO F1-4, CO F3-4 fuse	H
reinstalling, IN 4-4 removal, IN 4-2, IN 6-4 replacing rack-mount, MA 7-5 wall-mount, MA 7-2 testing rack-mount, MA 7-5 wall-mount, MA 7-2 type, MA 7-2, 5 FUNCTION, CO D2-2, CO D2-4, CO E1-5, CO E2-5, CO F1-3, CO F1-4, F1-5, F1-6, F1-7, F1-9, F1-12, F1-14, CO F2-3, F2-4, F2-6, F2-7, F2-10, F2-11, F2-12, CO F3-3, F3-5, F3-7, F3-8, F3-9, F3-11, F3-13, CO F4-3, CO G2-6, G2-7, G2-8, G2-9, G2-10, G3-3, CO G3-5	Half-duplex transmission, CO F1-4, CO F2-4, CO F3-4 HALF_DPLX, CO F1-4, CO F3-4 hardware flow control, CO B1-6 hardware maintenance MA 7-1 - 7-5 HCM rate adaption, CO G2-1 - G2-11 and DTUs, CO G2-3 configuring, CO G2-3 data position, CO G2-9 setting, CO G2-10 framing bit, CO G2-3 interface speed, CO G2-7 setting, CO G2-8 table, CO G2-9 overview, CO G2-2 signalling bit, CO G2-2 signalling, CO G2-8 setting, CO G2-8 transport bandwidth, CO G2-4, CO G2-6
G	pointers, CO G2-5 setting, CO G2-7
Ground Start definition, CO E1-5, CO E2-4 Ground Start and DNIS definition, CO E1-5 operation, CO E1-5 operation, CO E1-5 definition, CO E1-5 grounding, IN 4-1 – 4-10 cable for rack-mount, IN 4-8 for wall-mount, IN 4-2 permanent, IN 4-5 the rack-mount, IN 4-7 requirements, IN 2-2 separating signal and chassis ground wall-mount, IN 4-5	transport position, CO G2-6 setting, CO G2-6 HCM, CO G2-3 header line, CO A1-2 date, CO B2-2 illustration, CO B2-1 node name, CO B2-3 time, CO B2-2 hop definition, MA 6-2 HOPS_AWAY, MA 6-1, MA 6-3 HOUSE, MA 5-3

I	V.35 DCM module, IN 7-3
_	X.21 DCM module, IN 7-3
I, CO F3-7	installing a cabinet
IC extraction tool, IN 5-8	in shelf unit, IN 8-8
IC insertion tool, IN 5-7	Interface card, IN 1-6
I/F_MODE ,CO F1-3, CO F1-4, F1-5, F1-14,	installation, IN 6-3 - IN 6-4
CO F2-4, F2-11, F2-12, CO F3-3, F3-5,	LGS card IN 1-6
F3-13	location, IN 6-1
I/F_SPEED, CO F4-3, CO G2-8, CO G3-5	module positions, IN 6-2, IN 7-2
and super-rate speeds, CO F3-16	modules supported, IN 7-1
IDLE, CO D2-4, CO E1-7, CO E2-5, CO E3-6,	Universal card, IN 1-6
CO E4-4, CO F4-4	variants, IN 6-1
initiating	internal timing source, CO H1-2
2601, 2602, 2603 DTU, MA 4-5	INTERNAL, CO F1-12, CO F2-10, CO F3-11
2606 DTU, MA 4-7	introduction, IN 1-1
2608 DTU loopback, MA 4-9	inventory form, IN 3-4
2610 DTU loopback, MA 4-9	,
<u>-</u>	
DCM loopbacks, MA 4-12 OCU loopback, MA 4-11	
<u>-</u>	
T1 circuit loopback, MA 4-14 T1 link loopback, MA 4-15	II annual an
	J5 connector
voice module, MA 4-3	pin/signal assignment IN 11-2
INDEPNT, CO F1-7, CO F2-10, CO F3-11	J6 connector
INPUTS, CO F1-7, CO F2-6, CO F3-7 installation	pin/signal assignment IN 11-3
	Jam bit 7, CO D1-2
Control card modules, IN 5-8	JB7, CO D1-2
hardware required, IN 2-3	
interface card modules, IN 7-1 - 7-7	_
LGS card, IN 6-3 – 6-5	K
tools required, IN 2-3	<del></del>
Universal Interface card, IN 6-3 – 6-5	keyboard buffer
DTU modules, IN 5-6 – 5-8	clearing, CO A1-10
installation kit, IN 2-4	keyboard entries, CO A1-9
installation summary	definition CO A1-1
steps, IN 1-7	keys
installing	executing an entry, CO A1-10
4W TO module, IN 7-3	format, CO A1-9
Control card modules	with a character, CO A1-9
CSU, IN 5-5	with a name, CO A1-9
DDS, IN 5-5	
DSX-1, IN 5-5	
DTU, IN 5-67	[L]
LIM, IN 5-5	
Tone, IN 5-5	LAST_ALARM, MA 1-5
DNIC module, IN 7-3	LATER, MA 2-5
E&M module, IN 7-3	
interface card modules,IN 7-3	LBO, see line build out
LGE module, IN 7-3	LCL_OFF, CO 11-6, MA 2-8
LGS module, IN 7-3	LCL_ON, CO I1-6, MA 2-8
MRD module, IN 7-3	
OCU module, IN 7-3	
RS-232 DCM module, IN 7-3	

LEDs chassis cover, MA 1-2 – MA 1-3	module positions, IN 9-9 LGS module, CO E1-1 – E1-8 circuit signalling type, CO E1-5
Control card	circuit signaling type, CO E1-6
loopback, MA 1-5	fault signalling, CO E1-6
power indicator, MA 1-4	installing, IN 7-3
seven-segment display, MA 1-4	loopback MA 4-2
status, MA 1-5	pin/signal assignment, IN 9-4, IN 9-7,
Event Status, MA 1-2	IN 9-8, IN 9-11
faceplate coverMA 1-2 - MA 1-3	removing, IN 7-4
normal operation, MA 1-3	specifiying, CO C1-4
solutions, MA1-3	TLP ranges, CO E1-3
Interface card	LGS variants
status, MA 1-6	0156-02, CO C1-4
Link Quality, MA 1-2	0156-03 , CO C1-4
modules, MA 1-7	0156-06, CO C1-4
circuit status, MA 1-8	0156-07, CO C1-4
module status, MA 1-8	0156-08, CO C1-4
table, MA 1-8	LIM, IN 5-3
Out of Sync, MA 1-2	line loopback, MA 4-14
Power, MA 1-2	line loopback
Processor, MA 1-2	LIM, MA 4-14
System Status, MA 1-2	line loopback, T1 link, MA 4-14
LEVEL_0,	Line status LED, MA 1-8
setting, CO B3-2	LINE, MA 4-15
LEVEL_1, CO B3-5, B3-6	line build out, CO D1-3
LEVEL_2, CO B3-5, B3-6	setting, CO D1-3
LEVEL_3, CO B3-5, B3-6	line build-out switch
LEVEL_4, CO B3-5, B3-6	CSU modules, IN 5-6
LEVEL_5, CO B3-6	Line Interface Module, see LIM
LEVELS, CO E2-4, CO E3-4, CO E4-3, CO F5-3	line length, CO D1-2, D1-3
LGE, CO C1-5	setting, CO D1-2
LGE module, CO E2-1 – E2-5	LINE_LNGTH, CO D1-3
circuit signalling type, CO E2-4	LOCK, MA 3-3
fault signalling, CO E2-56	LOCKED, CO F1-12, CO F2-10
installing, IN 7-3	logging alarms, CO I1-7, MA 2-9
loopback MA 4-2	methods, CO I1-6
pin/signal assignment, IN 9-5, IN 9-8,	remotely, using CPSS, CO I1-6
IN 9-9, IN 9-12	to a device, MA 2-7
removing, IN 7-4	to the NOC via modem, MA 2-7
specifiying, CO C1-5	to the NOC via the T1 link, MA 2-7
TLP ranges, CO E2-3	to network management, CO I1-6
	to printer, CO I1-6
LGE variants 0526-01, CO C1-5	via modem, CO I1-6
	logging off, CO A1-11
0526-03, CO C1-5	automatically, CO A1-12
LGS, CO C1-4 LGS Interface card, CO E1-1, CO E2-1,	logging on, CO A1-4, CO A1-6
	procedure, CO A1-4
CO E4 -1	LOGGING, CO 11-6, MA 2-8
connectors, IN 6-2	loopback
pin/signal assignment, IN 9-11	and DDS loopbacks, MA 4-16
connecting	
external voice circuits, IN 9-10	
connector assignment, IN 9-9	

loopback A	post-wink duration, CO E1-6
2606 DTU, MA 4-6	wink duration, CO E1-6
port A, MA 4-8	LS_EM, CO E1-4
T1 circuit, MA 4-13	
super-rate, MA 4-13	
voice interface module, MA 4-2	M
loopback B	<del></del>
2606 DTU, MA 4-6	main menu, CO A1-3
DTU, MA 4-4	MAINT, MA 3-9
E&M module, MA 4-2	MAJOR, MA 2-4
port A, MA 4-8	manual recovery, CO H1-4
voice interface module, MA 4-2	MANUAL, CO H1-4
loopback B or C	
port B, MA 4-9	MARK, CO F1-10, CO F2-8, CO F3-9
loopback C	master device, CO F1-13
<sup>1</sup> 2606 DTU, MA 4-7	MASTER, CO F1-14, CO F2-11, CO F3-13
DCM, MA 4-12	MDM_OFF, CO I1-6, MA 2-8
DTU, MA 4-5	MDM_ON, CO I1-2, MA 2-8
OCU, MA 4-10	METHOD, CO G1-3, CO G2-3, CO G3-3
port A	MINOR, MA 2-4
2608, 2610, MA 4-9	module extraction tool, IN 7-4
T1 circuit	module position
super-rate, MA 4-13	configuration
voice interface module, MA 4-3	module types, CO C1-4
Loopback LED, MA 1-5	resource module, CO C1-3
LOOPBACK_A, MA 4-3, MA 4-6, MA 4-7,	default variants, CO C1-4
MA 4-9, MA 4-14	displaying, CO C1-2
LOOPBACK_B, MA 4-3, MA 4-5, MA 4-7,	identifiers, CO C1-2
MA 4-9, MA 4-12	naming, CO C1-11
	numbering, CO C1-1 – 2
LOOPBACK_C, MA 4-3, MA 4-5, MA 4-7,	quick configuration, CO C1-10
MA 4-8, MA 4-11, MA 4-12, MA 4-14 loopbacks	and super-rate circuits, CO F3-18
•	super-rate speeds
2601, 2602, and 2603 DTUs, MA 4-4	table, CO F3-16
2606 DTU, MA 4-7	Module status LED, MA 1-8
2608 and 2610 DTUs, MA 4-8	MORE, CO E1-6, CO E1-7
DCM, MA 4-11	MRD module, CO E4-1 – E4-4
DDS, MA 4-15	fault signalling, CO E4-4
network-directed, MA 4-16	installing, IN 7-3
OCU module, MA 4-11	pin/signal assignment, IN 9-4, IN 9-7,
purposes, MA 4-1	IN 9-8, IN 9-11
T1 circuit, MA 4-13	removing, IN 7-4
T1 link, MA 4-14	specifiying, CO C1-7
voice interface modules, MA 4-2	TLP ranges, CO E4-3
Loop Start, CO E1-5	multi-drop data bridge, CO F1-15, CO F2-13,
definition, CO E1-5, CO E2-4	CO F3-14
Loop Start and DNIS	and control signals, CO F1-13, CO F3-12
definition, CO E1-5	configuring, CO F1-16, CO F2-14, CO F3-
Loop Start and DNIS operation, CO E1-4	16
Loop Start – E&M	disabling, CO F1-14, CO F2-12, CO F3-13
definition, CO E1-4	master, CO F1-13, CO F2-11, CO F3-12
LS, CO E1-4, CO E2-4	and signalling, CO F1-11
LS_DNIS, CO E1-5	slave. CO F1-10

and duplex method, CO F1-13 MULTIDROP, CO F1-14, CO F2-11, CO F3-13	assigning, CO I1-2 definition, CO I1-1 NODE_NAME, CO B2-3 NODE_NUM, CO I1-2
	NONE, CO A1-12, CO B1-6, CO D2-4,
N	CO F1-10, CO F2-8, CO F3-9
NAME, CO C1-11	Non-Volatile Memory, see NVM
	NoSIG, CO D2-3
naming	NVM
a circuit, CO C2-2	viewing, MA 5-2
the link, CO D1-4	NVM_DATA, MA 5-2
module positions, CO C1-11	O
network-directed loopbacks, MA 4-16	—
trunk conditioning, MA 4-16	OCU, CO C1-7
network line	OCU loopbacks
connecting, IN 10-2, IN 10 3	initiating, MA 4-12
network management, CO A1-4, CO I1-1	removing, MA 4-13
alarm logging, CO I1-6	
and primary rate link connections,	OCU_LPBK, MA 4-11
CO I1-5	OCU loopback
communication path, CO I1-3	DDS, MA 4-15
via a modem, CO I1-4	initiating, MA 4-11
via a serial port, CO I1-4	removing, MA 4-11
via FDL, CO I1-5	OCU module, CO F4-1 – F4-4
via T1 circuit, CO I1-5	and DDS module, CO F4-1
Network Operations Center, see NOC	installing, IN 7-3
NMTI, CO A1-1 – A1-13	interface speed, CO F4-2
application areas, CO A1-3	and switched 56 service, CO F4-2
application areas, CO 111 0	loopback C, MA 4-10
connecting to, IN 11-4	OCU loopback, MA 4-10
display areas, CO A1-2	OCU(I) module
equipment, IN 11-4	pin/signal assignment, IN 9-4, IN 9-7,
formats	IN 9-8
summary, CO A1-13	OCU (II) module
keyboard entries, CO A1-9	pin/signal assignment, IN 9-4, IN 9-7,
main menu, CO A1-3	IN 9-8
screen display CO A1-2	and pin/signal assignments, CO F4-1
refreshing, CO A1-10	removing, IN 7-4
screen display	specifying, CO C18
serial port parameters, IN 11-4	and switched 56 data service, CO F4-4
No Date, CO B2-2	variants, CO F4-1
NO_ACCESS, CO B3-1, B3-6	OCU I module
NO_LEVEL_0, CO B3-2, B3-3	and switched 56 data service, CO F4-3
NOC number	
entering, CO I1-3	OCU II module
NOC, CO II-2	and switched 56 data service, CO F4-3
NOC NUM. CO I1-3, I1-4	OCU variants
Node Management Terminal Interface, see	0693-01, CO C1-7
NMTI	0693-02, CO C1-7
node name	ODD, CO F1-10, CO F2-8, CO F3-9
setting, CO B2-3	OFF, CO F1-7, CO F2-6, CO F3-7
node number	ON, CO F1-7, CO F2-6, CO F3-7
	ON_CIRCUIT, MA 4-3, MA 4-14
and CPSS, CO I1-1	ON_MODULE, MA 3-9, MA 4-15
and restarting the system, CO I1-1	_

ON RED CLR, CO C4-2 POSITION, CO C1-2 ON\_RESYNCH, CO C4-2 post-wink duration, CO E1-6 one way trunk conditioning, CO D3-2 configuring, CO E1-7 alarms, CO D3-2 Power indicator, MA 1-4 ONE\_WAY, CO D3-1, D3-4 Power LED, MA 1-2 OPEN\_CCT, MA 2-8 power rails, MA 7-1 OPTIONS, CO C1-6, CO D1-2, CO D3-4, connector voltages tolerances, MA 7-2 CO D4-2, CO E3-2 connector voltages, MA 7-2 OUTPUTS, CO F1-7, CO F2-67, CO F3-7 power requirements, IN 2-2 power supply, IN 1-5 power switch location AC rack-mount, IN 12-3 location AC wall-mount, IN 12-1 powering up Parity, CO F1-10 AC rack-mount system, IN 12-2 DNIC module, CO F1-10 AC wall-mount system, IN 12-1 RS-232 DCM, CO F2-8 DC rack-mount system PARITY, CO F1-10, CO F2-8, CO F3-9 equipment, IN 12-6 passwords, CO B3-6 DC wall-mount system, IN 12-4 changing CO B3-6 primary rate link personal computer, CO B1-3 naming, CO D1-4 pin/signal assignment PRINTER, CO B1-3 4W TO module, IN 9-4, IN 9-7, IN 9-8 Private Branch Exchange, CO E3-1 connector I4, IN 10-1 Private Line Automatic Ring connector J5, IN 11-2 definition, CO E1-5 connector J6, IN 11-3 Private Line Automatic Ring - Foreign connector J7, IN 13-2 **Exchange Office** DNIC module, IN 9-4, IN 9-7, IN 9-8 definition, CO E1-5 E&M module, IN 9-4, IN 9-7, IN 9-8 Private Line Automatic Ring - Foreign for connectors J1 and J3, IN 9-7 Exchange Office, CO E1-5 for connectors J1, IN 9-11 Private Line Automatic Ring, CO E1-4 for connectors J1, J2 and J3, IN 9-4 PROCEED, CO A1-9 for connectors J2, IN 9-8 pulling out a drawer, IN 12-6 for LGS card, IN 9-11 pushing in a drawer, IN 12-9 for Universal card (48 V), IN 9-7, IN 9-8 for Universal card, IN 9-4 LGE module, IN 9-4, IN 9-7, IN 9-8, Q IN 9-11 LGS module, IN 9-4, IN 9-7, IN 9-8, IN 9-11 quick circuit configuration, CO C2-3 MRD module, IN 9-4, IN 9-7, IN 9-8. quick circuit IN 9-11 cross-connection, CO C3-2 OCU (I)module, IN 9-4, IN 9-7, IN 9-8 disconnection, CO C3-4 OCU (II)module, IN 9-4, IN 9-7, IN 9-8 QUIT, CO A1-8 RS-232 DCM module, IN 9-4, IN 9-7, IN 9-8 V.35 DCM module, IN 9-4, IN 9-7, IN 9-8 X.21 DCM module, IN 9-4, IN 9-7, IN 9-8 PLAR, CO E1-4 rack-mount drawer, IN 1-2 PLAR\_FXO, CO E1-45 rack-mount units pointers for setting transport bandwith, connecting CO G1-5, CO G2-5 external voice and data circuits,

PORT\_TYPE, MA 5-3, CO B1-4

IN 9-12	Tone, IN 5-6
rack-mounting, IN 8-4 - 8-16	DCM loopbacks, MA 4-12
in a 19" rack, IN 8-6	DTU loopbacks, MA4-5
in a 23" rack, IN 8-7	DTU module, IN 5-8
tools required, IN 8-4, IN 8-6	DNIC module, IN 7-4
rate adaption	E&M module, IN 7-4
and clocking, CO F112	interface card modules, IN 7-4
configuring DDS, CO G3-3	LGE module, IN 7-4
DDS overview, CO G3-2	LGS module, IN 7-4
DDS, CO G3-1, CO G3-4	OCU loopback, MA 4-11
HCM, CO G2-1 - G1-11	OCU module, IN 7-4
data position, CO G2-9	RS-232 DCM module, IN 7-4
• . <u> </u>	T1 circuit loopback, MA 4-14
interface speed, CO G2-7	T1 link loopback, MA 4-15
overview, CO G2-2	V.35 DCM module, IN 7-4
signalling, CO G2-9	voice module loopbacks, MA 4-3
transport bandwidth, CO G2-4,	X.21 DCM module, IN 7-4
CO G2-6	
transport position, CO G2-6	REN, IN 1-5
HCM, CO G2-1	calculating, IN 1-5
interface speed (DDS), CO G3-5	repacking the shipment, IN 3-3
overview, CO G1-1	replacing the fuse
overview, CO G3-1	rack-mount, MA 7-6
transparent, CO G1-1 – G1-8	wall-mount, MA 7-4
configuring, CO G1-3	Request To Send, see RTS/CTS delay
overview, CO G1-2	resetting NVM, MA 5-3
transport bandwidth, CO G1-4 - G1-6	resource module
transport position, CO G1-6	types, CO C1-3
RATE_ADAPT, CO G1-3, CO G1-6, CO G1-7,	RESTART, MA 3-3
CO G2-3, CO G2-6, CO G2-7, CO G2-8, CO	RESTORE, MA 5-3, MA 5-6
G2-9, CO G2-10, CO G3-3, CO G3-5	RI, CO F1-7
RBS_OFF, CO D2-2	Ringing Equivalent Number, see REN
RBS_ON, CO D2-2	Ringing generator, IN 1-5
RDL, CO F1-7	RMT_OFF, MA 2-8, CO I1-6
READ/WRITE, CO B3-1, COB3-6	RMT_ON, MA 2-8, CO I1-6
READ_ONLY, CO B3-1, CO B3-6	robbed bit signalling, CO D2-1
RECOVERY, CO H1-4	and circuit cross-connections, CO D2-1
Red alarmCO D3-2	and CPSS, CO D2-1
clearing time, CO D3-7	and DCM circuits, CO D2-1
declaration time, CO D3-6	and DNIC circuits, CO D2-1
RED_OFF, CO D3-5	disnabling, CO D2-2
RED_ON, CO D3-5	enabling, CO D2-2
refreshing screen display, CO A1-10	routing table, MA 6-1
	RS232_DCM, CO C1-9
removing	RS-232 DCM
2608 DTU loopback, MA 4-10	and Universal Interface card, CO F2-1
2610 DTU loopback, MA 4-10	control signals
4W TO module, IN 7-4	table, CO F2-5
a circuit from busy-out, MA 3-8	
Control card modules	data structure, CO F2-6
DDS, IN 5-6	device mode, CO F2-2, 3
DSX-1, IN 5-6	duplex method, CO F2-3
DTU, IN 5-8	installing, IN 7-3
LIM, IN 5-6	parity, CO F2-8

pin/signal assignment, IN 9-4, IN 9-7,	device gender
IN 9-8	DNIC module, CO F1-4
RTS/CTS delay, CO F2-4	RS-232 DCM, CO F2-3
removing, IN 7-4	V.35 DCM, CO F3-3
specifiying, CO C1-8	X.21 DCM, CO F3-3
stop bits, CO F2-7	device mode
RS-232 distribution panel, IN 9-6	DNIC module, CO F1-3
running directed diagnostic tests, MA 3-3	RS-232 DCM, CO F2-2
RTS, CO F1-7, CO F2-6, CO F3-7	V.35 DCM, CO F3-3
RTS/CTS, CO F1-5, CO F2-4, CO F3-5	X.21 DCM, CO F3-3
RTS/CTS delay, CO F1-5, CO F2-4, CO F3-5	duplex method, CO F1-5
and duplex method, CO F1-5, CO F2-4,	DNIC module, CO F1-5
CO F3-5	RS-232 DCM, CO F2-4
RX_TLP, CO E1-4, CO E2-4, CO E3-4,	V.35 DCM, CO F3-5
CO E4-3, CO F5-3	X.21 DCM, CO F3-5
	fault signalling
	E&M module, CO E3-6
S	LGE module, CO E2-5
	LGS module, CO E1-7
SEIZED, CO D2-4, CO E1-7, CO E2-5,	MRD module, CO E4-4
CO E3-6, CO E4-4, CO F4-4	OCU module, CO F4-4
	interface speed, CO G2-8,.CO G3-5
self-tests, see diagnostics, IN 12-10 SELECT, CO H1-2	for OCU module, CO F4-3
•	line build out, CO D1-3
selecting clocking	line length, CO D1-3
CO F1-9, CO F2-10	parity
selecting failure recovery, CO H1-4	DNIC module, CO F1-10
selecting fault signalling	RS-232 DCM, CO F2-8
T1 circuits, CO D2-4	V.35 DCM, CO F3-9
selecting signalling type T1 circuits, CO D2-3	X.21 DCM, CO F3-9
selecting transmit clock	RTS/CTS Delay, CO F2-6
V.35 DCM, CO F3-11	DNIC module, CO F1-5
X.21 DCM, CO F3-11	RS-232 DCM, CO F2-4
selecting softkeys, CO A1-8	V.35 DCM, CO F3-5
SER_PORT_1, CO B1-4, CO B3-2	X.21 DCM, CO F3-5
SER_PORT_2, CO B1-4, CO B3-2	signalling, CO G2-9
serial port	signalling type
baud rate, CO B1-5	LGE circuits, CO E2-5
setting the device type, CO B1-4,	LGS circuits, CO E1-5
CO B1-5	stop bits
serial ports, CO B1-1	DNIC module, CO F1-9
data format CO B1-2	RS-232 DCM, CO F2-7
device type, CO B1-2	V.35 DCM, CO F3-8
flow control, CO B1-6	X.21 DCM, CO F3-8
SESSN_TIME, CO A1-12	swtiched 56 service
setting	OCU II, CO F4-3
baud rate, CO B1-5	
character length	T1 framing, CO D1-4
DNIC module, CO F1-9	TLP levels
RS-232 DCM, CO F2-7	4W TO, CO F5-3
V.35 DCM, CO F3-8	E&M module, CO E3-3
X.21 DCM, CO F3-8	LGE module, CO E2-3
data position, CO G2-10	LGS module, CO E1-3

MRD module, CO E4-3	software
transport bandwidth, CO G2-6	4600, CO B1-3
transport position, CO G2-7	communications, CO B1-3
serial ports	terminal emulation, CO B1-3
connectors, IN 11-1	software flow control, CO B1-6
location on Control card, IN 11-2	SPACE, CO F1-10, CO F2-8, CO F3-9
shelf components, IN 8-5	STANDARD, CO E3-4
shelf member, IN 8-5	Status LED
latch, IN 8-10	Control card, MA 1-5
SER_PORT_1, MA 5-3	Interface card, MA 1-6
SER_PORT_2, MA 5-3	Stop bits
SET_SIGNAL, MA 3-7	DNIC module, CO F1-9
seven-segment display	RS-232 DCM, CO F2-7
configuration, MA 1-4	V.35 DCM, CO F3-8
SHOW_ALL, CO C1-2	X.21 DCM, CO F3-8
SHOW_CUR, MA 3-4	STOP_BITS, CO F1-9, CO F2-7, CO F3-8
SHOW_CCT, CO C3-4	stuff bytes, CO G3-3
SHOW_GROUP, CO C3-4	start up diagnostics, IN 12-13 – 12-16
SIG, CO D2-3	stopping directed diagnostic tests, MA 3-4
SIG_OFF, CO G2 9	Sub-rate circuits
SIG_ON, CO G2 9	definition, CO F3-13
signalling	super-rate circuits, CO F3-13 - 3-22
and multi-drop data bridge, CO F1-13	and busy out circuits, MA 3-8
signalling bit, CO G2-2	cross-connections, CO F3-18
signalling type	and installed module positions,
LGE, CO E2-4	CO F3-22
LGS, CO E1-4	and starting T1 circuits, CO F3-20
selecting, CO D2-3	valid T1 circuit connections, CO F3-19
T1 circuits, CO D2-3	definition, CO F3-13
SHOW_LIST, MA 3-4	disconnecting
SHOW_NODES, MA 6-1, MA 6-2	V.35 DCM, CO F3-23
SHOW_SIGNAL, MA 3-7	X.21 DCM, CO F3-23
signalling leads, MA 3-6 - 3-8	loopbacks MA 4-11
DNIC circuits, MA 3-6	making cross-connections, CO F3-21
editing, MA 3-7	messages and warnings, CO F3-22
incoming	module position
table, MA 3-6	configuration, CO F3-14
outgoing	RESERVED, CO F3-15
table, MA 3-6	status, CO F3-15
super-rate circuits, MA 3-5	signalling leads, MA 3-5
viewing, MA 3-7	valid module positions
site requirements, IN 2-1	table, CO F3-21
slave device, CO F1-13	valid T1 circuit connections
SLAVE, CO F1-12, CO F1-14, CO F2-10,	table, CO F3-19
CO F2-11, CO F3-11, CO F3-13	super-rate speeds
softkey, CO A1-8	and transport bandwidth, CO F3-15
definition, CO A1-1	table, CO F3-16
display softkeys, CO A1-8	surge protection, IN 2-2
groups, CO A1-7	SW56_OFF, CO F4-3
selecting, CO A1-7	SW56_ON, CO F4-3
toggle, CO A1-7	Switched 56 operation, CO F4-3
softkey area CO A1-3	system diagnostics, MA 3-1
bordie, area de	· · · · · · · · · · · · · · · · · · ·

SYNC, CO F1-3, CO F2-2, CO F3-3	failure recovery, CO H1-4
SYNCH, CO H1-2, CO H1-3	failure threshold, CO H1-3
system diagnostic tests	internal, CO H1-3
disabling, MA 3-2	selecting the T1 source, CO H1-2
enabling, MA 3-2	T1, CO H1-2
restarting, MA 3-2	TLP
system timing	4W TO, CO F5-2
auto recovery, CO H1-2	E&M, CO E3-3
cannot lock, CO H1-2	LGE, CO E2-2
current, CO H1-2	LGS, CO E1-2
disabled, CO H1-2	MRD, CO E4-2
not ready, CO H1-2	receive, CO E1-2, CO E2-2,
ready, CO H1-2	CO E3-3, CO E4-2
sources, CO H1-1	transmit, CO E1-3, CO E2-3,
status definitions, CO H1-2	CO E3-4, CO E4-2
time recovery, CO H1-2	TLP ranges
	4W TO
	table, CO F5-3
T	for E&M module, CO E3-4
	for LGE module, CO E2-3
T1 circuit	for LGS module, CO E1-3
and super-rate circuits, CO F3-18	for MRD module, CO E4-3
disabling trunk conditioning, CO D3-4	setting E&M, CO E3-4
initiating loopbacks, MA 4-15	setting LGE, CO E2-4
loopback A, MA 4-13	setting LGS, CO E1-4
loopback C, MA 4-13	setting MRD, CO E4-3
loopbacks, MA 4-13	table (4W TO), CO F5-3
numbering, CO C2-1	table (E&M), CO E3-4
operating parameters, CO D2-1	table (LGE), CO E2-3
removing loopbacks, MA 4-15	table (LGS), CO E1-3
super-rate	table, (MRD) CO E4-3
loopback A, MA 4-13	TO_CIRCUIT, CO C3-1
loopback C, MA 4-13	toggle softkeys, CO A1-7
super-rate speeds	TONE_GEN, CO C1-3
table, CO F3-16	Tone module, IN 5-3
T1 connector, see connector J4	terminal block
T1 link	DC wall-mount, IN 12-5
equipment loopback, MA 4-14	Tone module, IN 5-3
initiating loopbacks, MA 4-15	transmission level points, see TLP
line loopback, MA 4-14	transmit clock
loopbacks, MA 4-14	and device gender, CO F1-11, CO F3-13
removing loopbacks, MA 4-15	configuring, CO F1-12, CO F2-10
terminal block	DNIC module, CO F1-11
DC wall-mount, IN 12-5	V.35 DCM
terminal emulation software, CO B1-3	and device gender, CO F3-10
THRESHOLD, CO H1-3	and device mode, CO F3-10
time	X.21 DCM
format, CO B2-2	and device gender, CO F3-10
setting, CO B2-2	and device mode, CO F3-10
TIME, CO B2-2	TRANSP, CO D1-2
timed recovery, CO H1-4	TRANSP_BW, CO G1-6, CO G2-6
timing source	TRANSP_POS, CO G1-8, CO G2-7

modules supported, IN 7-1

transparent rate adaption, CO D1-1, CO G1-1 – G1-9 and asynchronous data, CO G1-3 configuring, CO G1-3 overview, CO G1-2 setting the transport bandwidth, CO G1-6 setting transport position, CO G1-7 transport bandwidth, CO G1-4 – G1-6 transport position and transport bandwith, CO G1-6 transport bandwidth, CO G1-6 transport bandwidth, CO G1-6 transport bandwidth, CO G1-5, CO G2-4 and transport position, CO G1-8	pin/signal assignment, IN 9-4 Universal card (48 V), IN 9-5 – 9-8, CO E1-1, CO E2-1, CO E3-1, CO E4-1, CO F4-1, CO F5-1 blank module, CO F3-15 connecting external voice and data circuits, IN 9-6 connector assignment, IN 9-5 supported, IN 7-1 pin/signal assignment, IN 9-7, IN 9-8 unpacking and inspection, IN 3-1
transport position	V
and transport bandwidth, CO G1-6	
trunk conditioning, CO D3-1	valid module positions
configuring, CO D3-4	table, CO F3-20
definition, CO D3-1	valid T1 circuit connections
disabling for a circuit, CO D3-4	table, CO F3-19
enabling, CO D3-4	verifying the database, MA 5-5
network-directed loopbacks, MA 4-16	VERIFY, MA 5-5
one way, CO D3-2 two way, CO D3-3	VIA_PATH, MA 6-1, MA 6-4
types, CO D3-1	viewing
TRUNK_COND, CO D3-4, D3-5	alarms, MA 1-6 CPSS routing, MA 6-2
two way-trunk conditioning, CO D3-3	signalling leads, MA 3-7
TWO_WAY, CO D3-1, D3-4	system timing information, CO H1-1
TX_TLP, CO E1-4, CO E2-4, CO E3-4,	VIEW_NET, MA 6-2
CO E4-3, CO F5-3	visual indicators, MA 1-1 – MA 1-8
TYPE, CO C1-3	V.35_DCM, CO C1-10
	V.35 DCM module, CO F3-1 - F3-22
	and Universal Interface card, CO F3-1
U	control signals
	types, CO F3-8
UNBUSY, MA 3-8	data structure, CO F3-7
UNDO_LPBK MA, 4-15	device gender, CO F3-3
UNDO_LPK, MA 4-3, MA 4-5, MA 4-7,	device mode, CO F3-2
MA 4-10, MA 4-11, MA 4-12, MA 4-14	duplex method, CO F3-5
UNDO_MAINT, MA 4-3, MA 4-7, MA 4-10,	installing, IN 7-3
MA 4-11, MA 4-13, MA 4-14	multi-drop data bridge, CO F3-11
UNLIMITED, CO H1-3	pin/signal assignment, IN 9-4, IN 9-7,
Universal card, IN 9-1 – 9-4, CO E1-1,	IN 9-8
CO E2-1, CO E3-1, CO E4-1, CO F4-1,	removing, IN 7-4
CO F5-1	RTS/CTS delay, CO F3-5
blank module, CO F3-15	specifying, CO C1-10
connecting	super-rate circuits, CO F3-13 – F3-22
external voice and data circuits,	transmit clock, CO F3-11 VOICE, CO C1-4, CO C1-5, CO C1-7, CO D2-3
IN 9-3	
connector assignment, IN 6-2, IN 9-2	voice circuits circuit numbering, CO C2-1
installation, IN 6-3	circuit ituitocinis, CO CE i

voice modules
initiating loopbacks, MA 4-3
loopback A, MA 4-2
loopback B, MA 4-2
loopback C, MA 4-3
removing loopbacks, MA 4-3
specifiying E&M, CO C1-7
specifiying LGE, CO C1-6
specifying LGS, CO C1-5
specifying MRD, CO C1-8
VT100, MA 5-3, CO B1-2
VT100-compatible terminal, CO B1-3

#### W

wall-mount unit, IN 1-1
wall-mounting
on a rack, IN 8-2
tools required, IN 8-1, IN 8-2
wink duration
configuring, CO E1-6
WINKTIME, CO E1-6

#### X

X1, MA 3-3 X10, MA 3-3 X.21\_DCM, CO C1-10 X.21 DCM module, CO F3-1 - F3-22 and Universal Interface card, CO F3-1 control signals table, CO F3-6 data structure, CO F3-9 device gender, CO F3-3 device mode, CO F3-2 duplex method, CO F3-4 installing, IN 7-3 multi-drop data bridge, CO F3-14 pin/signal assignment, IN 9-4, IN 9-7, IN 9-8 RTS/CTS delay, CO F3-5 removing, IN 7-4 specifiying, CO C1-8 super-rate circuits, CO F3-13 - F3-22 transmit clock, CO F3-10  $X_ON/X_OFF$ , CO B1-6 X100, MA 3-3

#### Y

yellow alarm clearing CO D4-1
declaration time, CO D3-6
selecting, CO D4-2
yellow alarm handling
with D4 framing, CO D4-1
with ESF framing, CO D4-1
yellow alarm handling, CO D4-1 – D4-2
YELLOW\_CLR, CO D4-2
YELLOW\_OFF, CO D3-5
YELLOW\_ON, CO D3-5

#### Z

Zero code suppression, CO D1-1 configuring, CO D1-2